Serial-Ethernet Server

STE-502C

User's Manual

Version 1.2

AAXEON TECHNOLOGIES

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Published by
Aaxeon Technologies, LLC
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This document is intended to provide customers with brief descriptions on the product and to assist customers to get started. For detail information and operations of the product, please refer to this manual or the CD attached.

FCC WARNING

Class A for Ethernet Serial Server

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and radiates radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expenses.

A shielded-type power cord is required in order to meet FCC emission limits and also to prevent interference to the nearby radio and television reception. It is essential that only the supplied power cord can be used.

Use only shielded cables to connect the device's RS-232 or RS-485 port.

Be cautioned that changes or modifications not explicitly approved by Aaxeon Technologies could void your authority to operate the equipment.

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1 INTRODUCTION

Many industrial and Commercial devices equipped with slow serial communication ports RS-232, RS-485, and RS-422 are limited in their transmission distance of 15 m. Examples of these devices are PLC controllers, card readers, display signs, security controls, CNC controller, etc. Aaxeon Technologies has overcome the limit with a family of STE-50x Series Ethernet Serial Servers. The STE-50x sever family is designed to transmit data between one-or-more serial device and one-or-more TCP/IP device through Ethernet, and hence enhance the accessibility of the serial device through the ubiquitous TCP/IP based Ethernet.

1.1. Packaging

Check your package to make certain it contains the following items:

- STE-502C Ethernet Serial Device Server
- Quick Installation Guide
- Product CD
- Wall-mounting screws
- 3-pin terminal block*1 for power input only for STE-502C
- 5-pin terminal block with lock*2 only for STE-502C

1.2. Modes of Operation

The STE-502C can be operated in one of the following 4 modes:

TCP Server Mode：STE-502C can be configured in a TCP server mode on an Ethernet Network to wait for the host computer to establish a connection with the serial device (the client). After the connection is established, data can flow in both directions (Fig.1 TCP Server Mode).

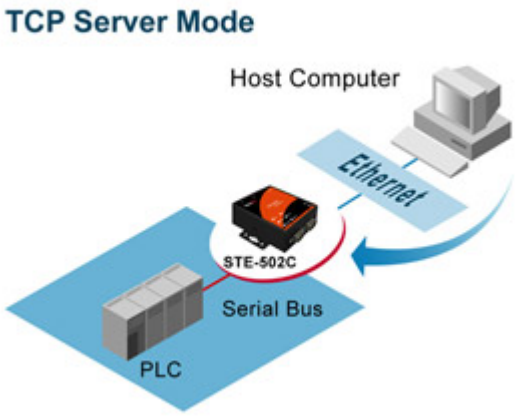

Fig. 1. TCP Server Mode

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TCP Client Mode : STE-502C can be configured in a TCP client mode on a TCP/IP Network to actively establish a connection with an applications server –the host computer. After the connection is established, data can flow in both directions (Fig 2 TCP Client Mode).

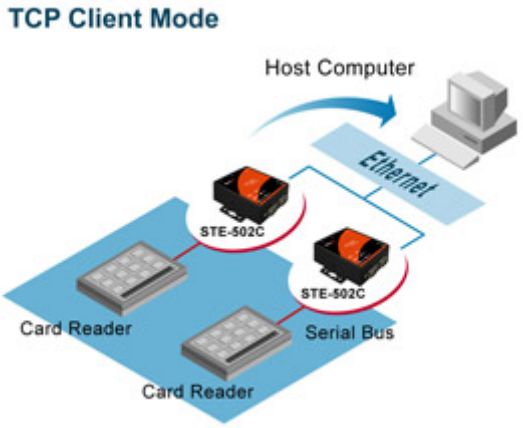

Fig. 2. TCP Client Mode

UDP Mode : UDP is a fast but non-guaranteed datagram delivery protocol. STE-502C can be configured in a UDP mode on a TCP/IP Network to establish a connection, using unicast or broadcast data to and from a serial device to one or multiple host computers (Fig 3 UDP Mode).

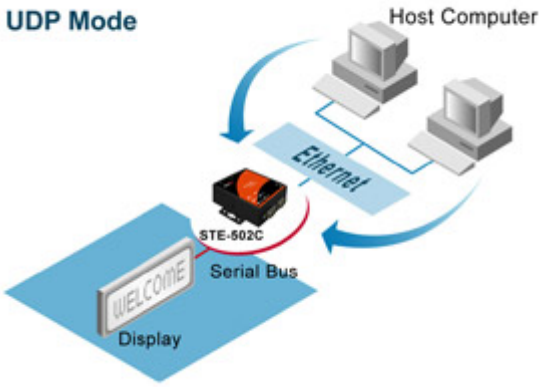

Fig. 3. UDP Mode

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Tunneling Mode(Pair Connection) : The tunneling mode is used for multiple serial devices to "talk" to each other through STE-502C's and their Ethernet connections (Fig 4 Tunneling Mode). This mode is particularly useful when two serial devices are far away, because their communication distance is limited to 15 m.

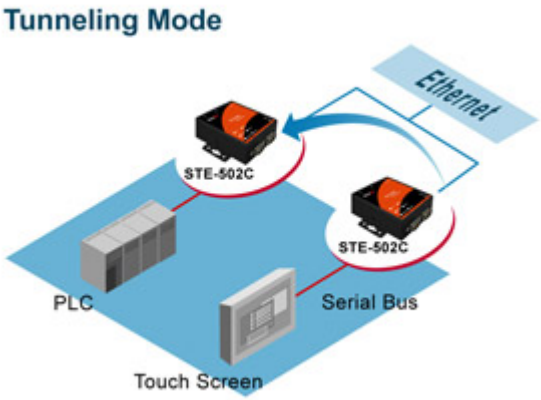

Fig. 4. Tunneling Mode

1.3. Hardware Description

NOTE:

1. **Model STE-502C** is for RS-232/422/485 without isolation protection built-in. See Appendix A.3.1 for full Panel layout.
2. Press the **reset** button to reset to the default values

Fig. 5 Shows the STE-502C interface.

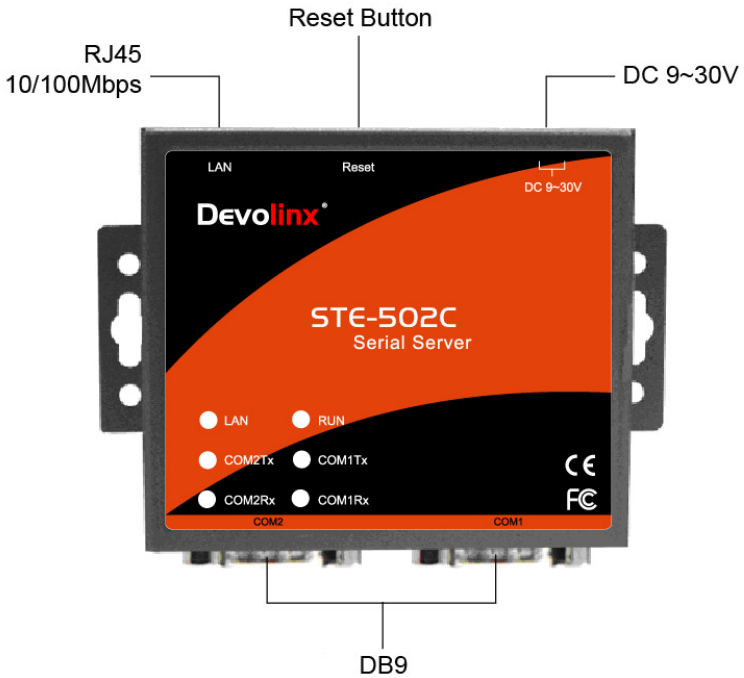

Fig. 5. STE-502C Interface

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2. LED STATUS

2.1 LAN

Message	Description
Off	Ethernet Disconnected
Blinking Green	Data transmitting on Ethernet at 100Mbps
Blinking Orange	Data transmitting on Ethernet at 10Mbps

Table 1. LAN LED Status

2.1.2 COM

Message	Description
Off	No data transmitting on COM port
Com1(2)TX Blinking	Data transmitting on COM port
Com1(2)RX Blinking	Data receiving on COM port

Table 2. COM Port LED Status

2.1.3 RUN

Message	Description
On	Jumper JP1 Pin1 and Pin2 shorted to disable AP firmware
Blinking	AP firmware running normally

Table 3. RUN LED Status

2.2 Installation Procedures:

Step 1: Connect STE-502C power source Jack.
Step 2: Connect STE-502C to the Ethernet network. Use a standard straight-through Ethernet cable when connected to a hub/switch, or connect to a PC's Ethernet port via a cross-over Ethernet cable. However, Always make sure ones PC is on the same sub-net as the STE-502C.
Step 3: Connect STE-502C's serial port to a serial device.
Step 4: Mount STE-502C to a wall/panel with the screws included or to a Din-Rail rack (Require optional Din-Rail-Kit).

3. SOFTWARE

The STE-502C default parameters are shown in the following table.

Property	Default Value
IP Address	**10.0.50.100**
Gateway	**10.0.0.254**
Subnet Mask	**255.255.0.0**
User Name	**admin**
Password	**Null(leave it blank)**
COM 1	9600,None, 8, 1, No flow control, buffer disabled, packet delimiter timer 2ms
COM 2	9600,None, 8, 1, No flow control, buffer disabled, packet delimiter timer 2ms
Link 1	Type: TCP Server, Listen port 4660, Filter=0.0.0.0, Virtual COM disabled
Link 2	Type: TCP Server, Listen port 4661, Filter=0.0.0.0, Virtual COM disabled
SysName of SNMP	name
SysLocation of SNMP	location
SysContact of SNMP	contact

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3.1 Configuration by monitor.exe utility

Use **monitor.exe** on product CD to configure the STE-502C. First click "**Config**" (Fig. 6) then assign a static IP (Fig. 7).

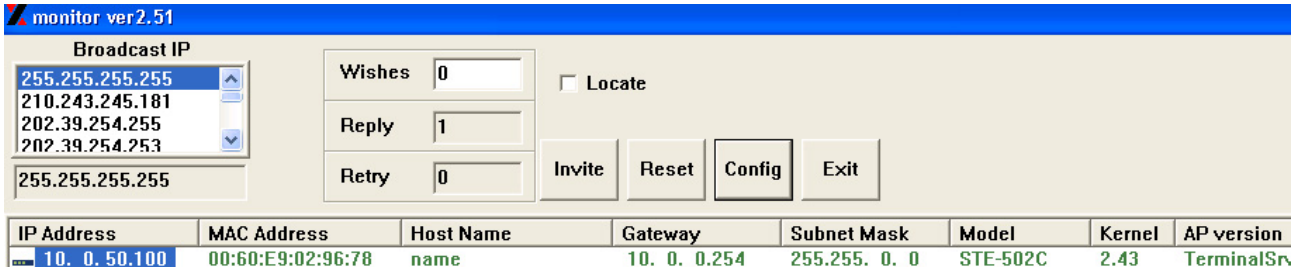

Fig. 6. Configuring the static IP with monitor.exe utility

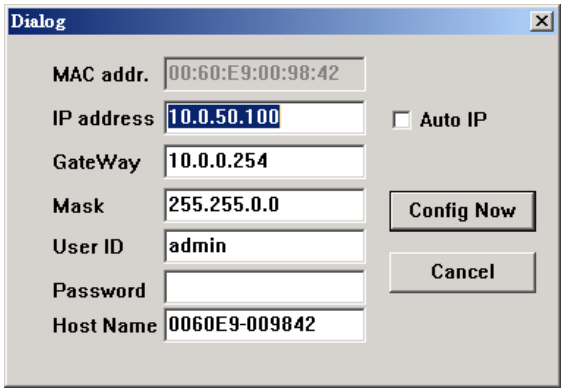

Fig. 7. Static IP dialog window

A DHCP server can automatically assign the IP address and all the network settings, and STE-502C supports the DHCP client functions. By default, the DHCP client function on STE-502C is disabled; one may activate the DHCP client functions by the following steps :

- ➔ Execute Monitor.exe(Fig. 6)
- ➔ Click on the **IP address** (of STE-502C)
- ➔ Click "***Config***" to pop-up the static IP Dialog Window (Fig. 7)
- ➔ Check "***Auto IP***" (Fig. 8)
- ➔ Click " ***Config Now***" (The STE-502C will restart and obtain the IP from the DHCP server automatically)

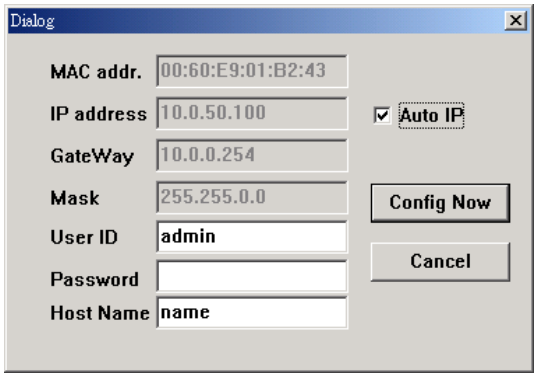

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Fig. 8. Monitor.exe Auto IP Dialog Window

3.2 Configuration by Telnet utility:

One may also use Telnet utility to change configuration settings.

➔ Open Ms-DOS command prompt window

➔ Enter in the "**Telnet IP_address 23** ".(For example, **Telnet 10.0.50.100 23**). The system then prompts for a password, the default password is Null (Leave it blank). (Fig. 9)

Fig. 9. Telnet to the system

Note: One may press the reset button to reset the password..

1 Then the following main menu shall appear (Fig. 10)

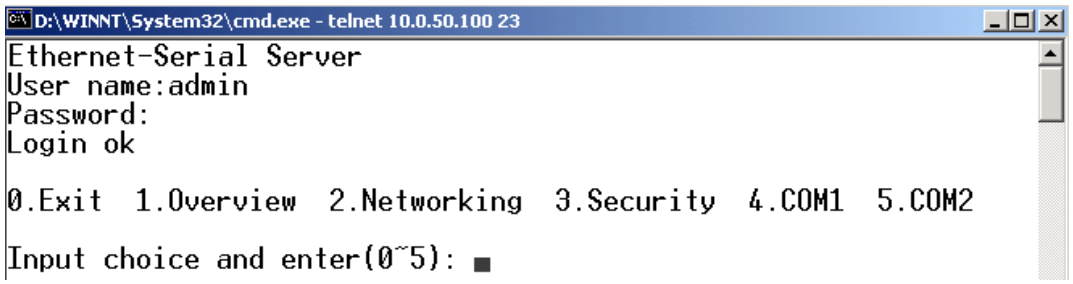

Fig. 10. System main menu

Notes:

1. If the STE-502C does not receive any command within 1 **minute**, Telnet will be terminated automatically.
2. The changes of networking parameters will take effect only after the STE-502C is exited and restarted.

->Select "**1**" from "***Input choice and enter (0~5):***" to enter "**overview**" .:(Fig. 11)

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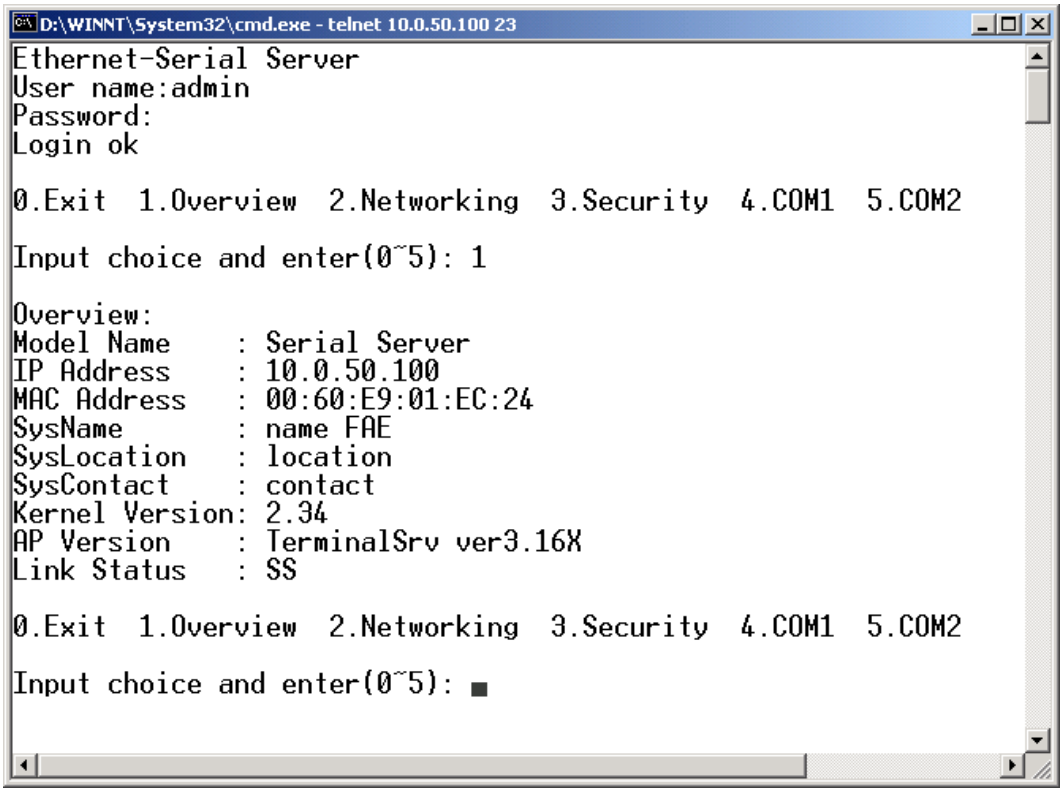

Fig. 11. System configuring using Telnet

This system overview window gives the general information on IP, MAC address, SNMP information, kernel and AP version, and the connection status of the device.
Select "**2**" on "**Input choice and enter *(0~5)*:**" to enter **Networking** window (Fig. 12).

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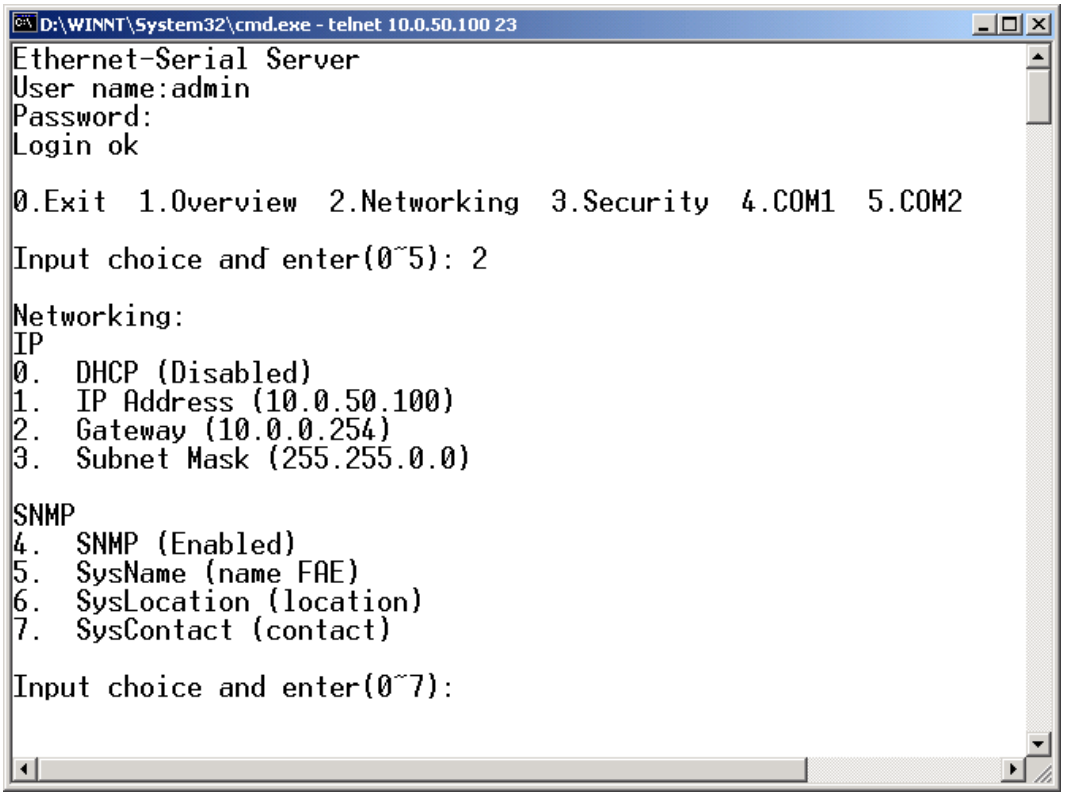

Fig. 12. Network configuring using Telnet

This screen allows for changes in **IP address, subnet mask, gateway IP address and SNMP** information. Please note that setting changes will not take effect until the device is restarted.
Note: Press "***ESC***" key to return to the previous menu .

1. Select "***3***" on "***Input choice and enter (0~5):***" (Fig. 13).

Select D:\WINNT\System32\cmd.exe - telnet 10.0.50.100 23
Ethernet-Serial Server
User name:admin
Password:
Login ok
0.Exit 1.Overview 2.Networking 3.Security 4.COM1 5.COM2
Input choice and enter(0~5): 3
Do you want to change the password (y/n)?y
Please input old password:
Please input new password:****
Please verify new password:****
Password changed! Press enter to continue

Fig. 13. changing password using Telnet

2. Enter the old password on "***Please input old password***". Enter in the new password on "***Please input new password***" , and again on "***Please verify new password***" fields.

Note: One may press the **Reset** key on the product to reset password.

Select "**4**" on "***Input choice and enter (0~5):***" (Fig. 14).

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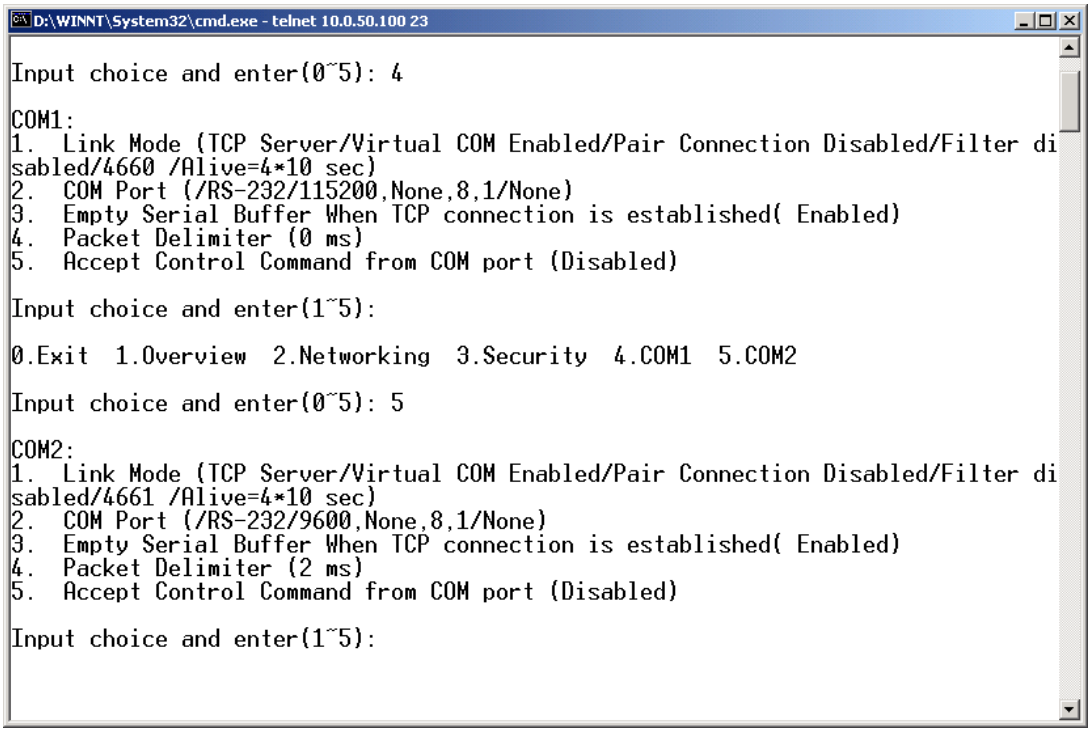
D:\WINNT\System32\cmd.exe - telnet 10.0.50.100 23
Input choice and enter(0~5): 4
COM1:
1. Link Mode (TCP Server/Virtual COM Enabled/Pair Connection Disabled/Filter disabled/4660 /Alive=4*10 sec)
2. COM Port (/RS-232/115200,None,8,1/None)
3. Empty Serial Buffer When TCP connection is established(Enabled)
4. Packet Delimiter (0 ms)
5. Accept Control Command from COM port (Disabled)
Input choice and enter(1~5):
0.Exit 1.Overview 2.Networking 3.Security 4.COM1 5.COM2
Input choice and enter(0~5): 5
COM2:
1. Link Mode (TCP Server/Virtual COM Enabled/Pair Connection Disabled/Filter disabled/4661 /Alive=4*10 sec)
2. COM Port (/RS-232/9600,None,8,1/None)
3. Empty Serial Buffer When TCP connection is established(Enabled)
4. Packet Delimiter (2 ms)
5. Accept Control Command from COM port (Disabled)
Input choice and enter(1~5):

Fig. 14. Com1 setup

Here one may configure COM1 parameters, include COM1 operation mode, port parameters, enabling or disabling serial buffer's data and packet delimiter.

LINK Mode Setup **Configure STE-502C as TCP server** : (Fig. 14)

➔ Enter **1** on "***Input choice and enter (1~5):***" to select COM1

➔ Enter **1** on "***Input choice(1~5) and enter :*** " to select **Overview**

➔ Input local port on "***Please input local port :*** "

1. **If one want to enable IP filter :**

➔ Input **y** on "***Do you want to enable IP filter(y/n)?***"

➔ Input source IP on "***Please input Filter_IP : "***

➔ Double click "***Enter***" key

2. **If one don't want to enable IP filter :**

➔ Input **n** on "***Do you want to enable IP filter(y/n)?***"

➔ Double click "***Enter***" key

➔ Input idle time in "***Please input idle time to send TCP alive packet(4*10sec) :*** "(**2**->the sending TCP keep-alive packet period is 2*10 sec)

Note:

1. One may configure COM1 or COM2 parameter by choosing COM1 or COM2 Link
2. "IP filtering function is disabled by setting FILTER_IP to "0.0.0.0".
3. IP filter is disabled by default
4. If IP filter is enabled, only the source IP assigned can be connected to STE-502C.

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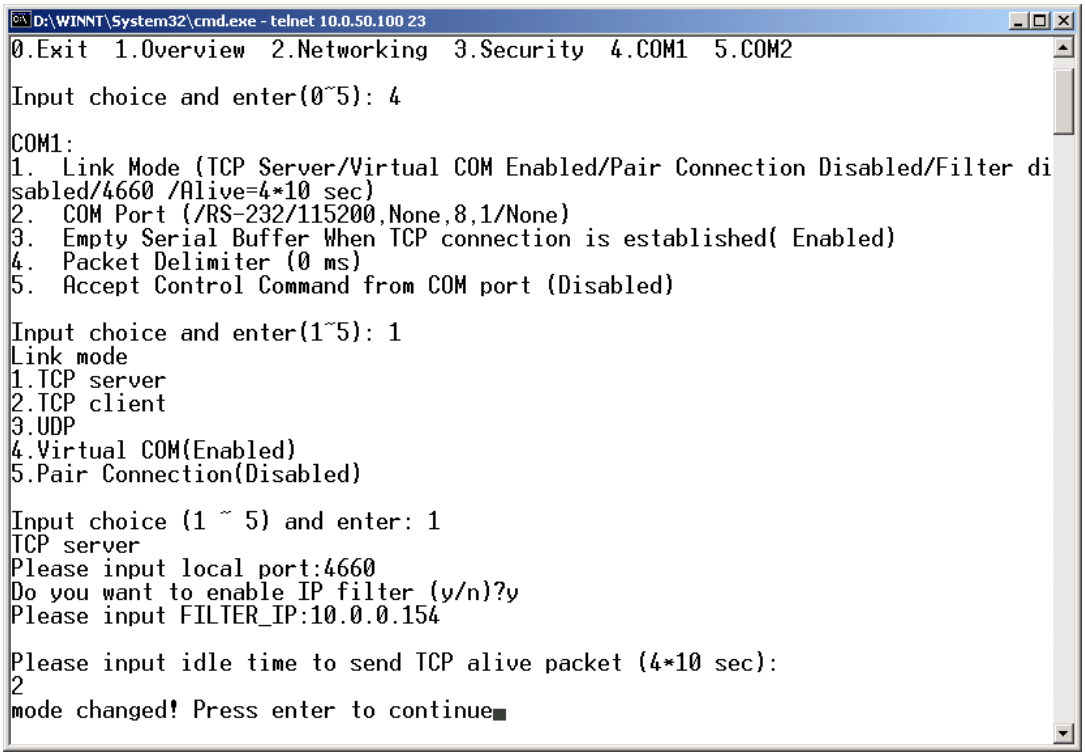
D:\WINNT\System32\cmd.exe - telnet 10.0.50.100 23
0.Exit 1.Overview 2.Networking 3.Security 4.COM1 5.COM2
Input choice and enter(0~5): 4
COM1:
1. Link Mode (TCP Server/Virtual COM Enabled/Pair Connection Disabled/Filter di
sabled/4660 /Alive=4*10 sec)
2. COM Port (/RS-232/115200,None,8,1/None)
3. Empty Serial Buffer When TCP connection is established(Enabled)
4. Packet Delimiter (0 ms)
5. Accept Control Command from COM port (Disabled)
Input choice and enter(1~5): 1
Link mode
1.TCP server
2.TCP client
3.UDP
4.Virtual COM(Enabled)
5.Pair Connection(Disabled)
Input choice (1 ~ 5) and enter: 1
TCP server
Please input local port:4660
Do you want to enable IP filter (y/n)?y
Please input FILTER_IP:10.0.0.154
Please input idle time to send TCP alive packet (4*10 sec):
2
mode changed! Press enter to continue

Fig. 15. Link Mode-TCP server setup

➔ Enter **2** on "***Input choice(1~5) and enter :*** "(Fig. 15)

➔ Input destination IP on "***Please input Destination IP :*** " (for instance: **10. 0. 29. 123**)

➔ Input destination port on "***Please input Destination port :*** "(for instance: **1234**)

1. Enter **1** for Connected always :

➔ Double click "***Enter***" key

➔ Input idle time in "***Please input idle time to send TCP keep-alive packet(4*10sec) :*** "(**2**->the sending TCP keep-alive packet period is 2*10 sec)

2. Enter **2** for Triggering by received COM port data :

➔ Input idle time to disconnect on "***Please input idle time to disconnect(0sec , 1~255) :*** " (**0**->disable the function; **2** ->the serial Inactivity beyond 2 sec will cause disconnect)

➔ Input error retrying time on "***Please input waiting time for error retrying (0 minute,1~255) :*** " (**0**->disable the function; **2** ->STE-502C trying to reconnect per 2 minutes)

➔ Double click "***Enter***" key

➔ Input idle time on "***Please input idle time to send TCP keep-alive packet (4*10sec) :*** "(**2**-> sending TCP keep-alive packet period will be 2*10 sec)

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```
COM1:
1.  Link Mode (TCP Server/Virtual COM Enabled/Pair Connection Disabled/Filter di
sabled/4660 /Alive=2*10 sec)
2.  COM Port (/RS-232/115200,None,8,1/None)
3.  Empty Serial Buffer When TCP connection is established( Enabled)
4.  Packet Delimiter (0 ms)
5.  Accept Control Command from COM port (Disabled)

Input choice and enter(1~5): 1
Link mode
1.TCP server
2.TCP client
3.UDP
4.Virtual COM(Enabled)
5.Pair Connection(Disabled)

Input choice (1 ~ 5) and enter: 2
TCP client
Please input destination IP:10.0.29.123
Please input destination port:1234

Please select connected type (2)
(1)Connected always
(2)Trigger by receiving COM port data
1

Please input idle time to send TCP alive packet (2*10 sec):
2
mode changed! Press enter to continue
```

Fig. 16. Link Mode-TCP client setup

In this example the **local port** is 4660; the **destination IP** is 10.0.29.254, and the **destination port** is 1234(Fig. 17)

```
D:\WINNT\System32\cmd.exe - telnet 10.0.50.100 23
0.Exit  1.Overview  2.Networking  3.Security  4.COM1  5.COM2

Input choice and enter(0~5): 4

COM1:
1.  Link Mode (TCP Client/Pair Connection Disabled/Remote 10.0.29.123/1234/
    Connected always /Alive=2*10 sec)
2.  COM Port (/RS-232/115200,None,8,1/None)
3.  Empty Serial Buffer When TCP connection is established( Enabled)
4.  Packet Delimiter (0 ms)
5.  Accept Control Command from COM port (Disabled)

Input choice and enter(1~5): 1
Link mode
1.TCP server
2.TCP client
3.UDP
4.Virtual COM(Enabled)
5.Pair Connection(Disabled)

Input choice (1 ~ 5) and enter: 3
UDP
Please input local port:4660
Please input destination IP:10.0.29.254
Please input destination port:1234
mode changed! Press enter to continue

COM1:
1.  Link Mode (UDP Destination/4660/Remote IP=10.0.29.254/666)
2.  COM Port (/RS-232/115200,None,8,1/None)
```

Fig. 17. Link Mode-UDP client setup

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Enter **2** on "***Input choice and enter (1~5):***" of COM1, the following screen shall appear; then proceed to assign the COM port **alias**, set **baud rate** and **parity**, determine number of **data bit** and **stop bit**, and decide on the need of **flow control** (Fig. 18)

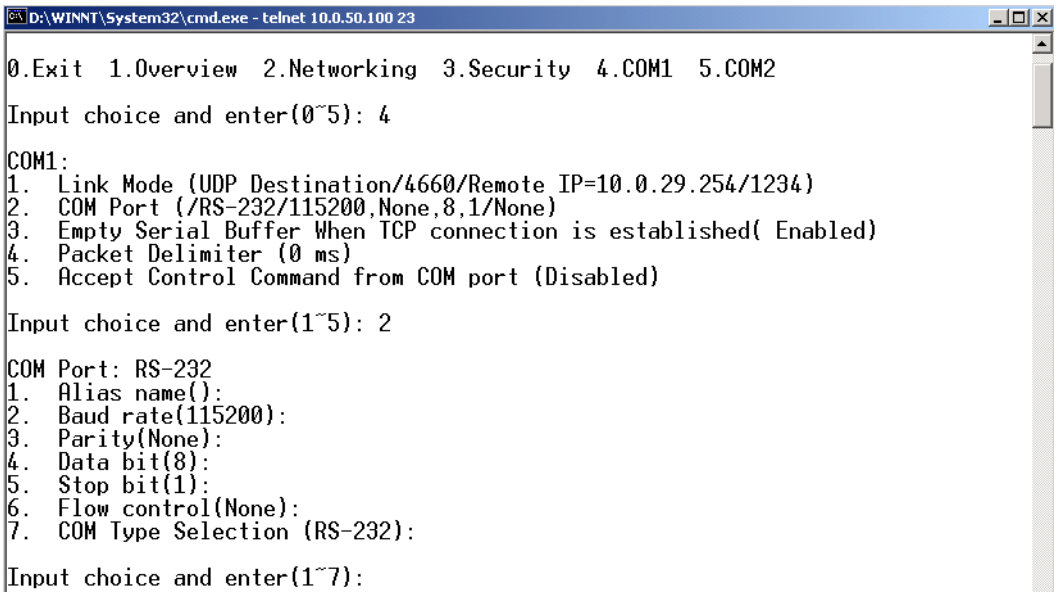
D:\WINNT\System32\cmd.exe - telnet 10.0.50.100 23
0.Exit 1.Overview 2.Networking 3.Security 4.COM1 5.COM2
Input choice and enter(0~5): 4
COM1:
1. Link Mode (UDP Destination/4660/Remote IP=10.0.29.254/1234)
2. COM Port (/RS-232/115200,None,8,1/None)
3. Empty Serial Buffer When TCP connection is established(Enabled)
4. Packet Delimiter (0 ms)
5. Accept Control Command from COM port (Disabled)
Input choice and enter(1~5): 2
COM Port: RS-232
1. Alias name():
2. Baud rate(115200):
3. Parity(None):
4. Data bit(8):
5. Stop bit(1):
6. Flow control(None):
7. COM Type Selection (RS-232):
Input choice and enter(1~7):

Fig. 18. Com port setting

Enter **3** from "***Input choice and enter (1~5):***" of COM1, by default COM port serial data buffer is enabled meaning that when TCP/IP Ethernet connection is broken, serial data collected from serial device will be emptied on STE-502C once TCP/IP connection is resumed, the serial data will be sent through Ethernet connection, one may disable it if one wish(Fig. 19)

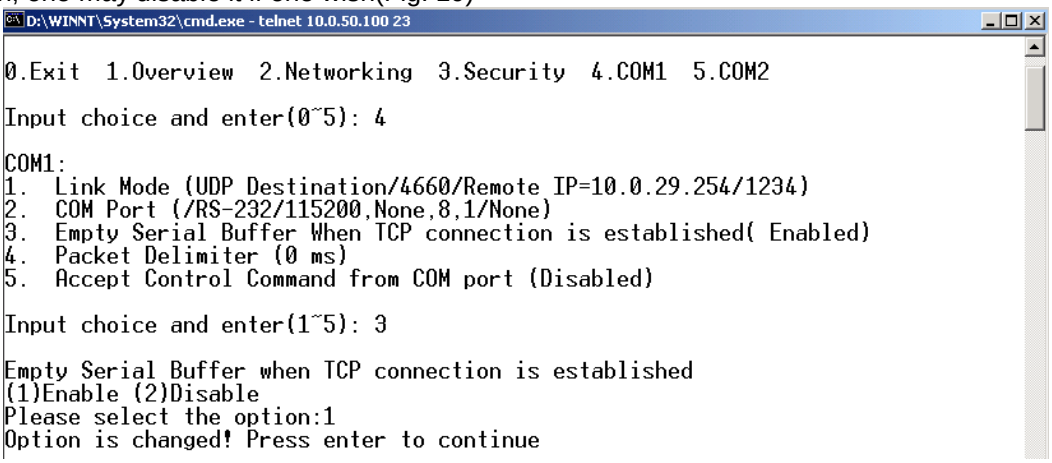
D:\WINNT\System32\cmd.exe - telnet 10.0.50.100 23
0.Exit 1.Overview 2.Networking 3.Security 4.COM1 5.COM2
Input choice and enter(0~5): 4
COM1:
1. Link Mode (UDP Destination/4660/Remote IP=10.0.29.254/1234)
2. COM Port (/RS-232/115200,None,8,1/None)
3. Empty Serial Buffer When TCP connection is established(Enabled)
4. Packet Delimiter (0 ms)
5. Accept Control Command from COM port (Disabled)
Input choice and enter(1~5): 3
Empty Serial Buffer when TCP connection is established
(1)Enable (2)Disable
Please select the option:1
Option is changed! Press enter to continue

Fig. 19. Com port-Enabling serial data buffer

Packet delimiter is a way of controlling the number of packets in a serial communication. It is designed to keep packets intack. STE-502C provides two ways in parameter setting: 1. Packet delimiter timer and 2 . Character pattern terminator . By default, packet delimiter timer is 1 ms. The range of packet delimiter timer is 0 to 30,000 msec, as shown in Fig. 20. If "character pattern is selected, for a data stream ended with "0x0a04", then the entire data buffer of the serial device is transmitted.

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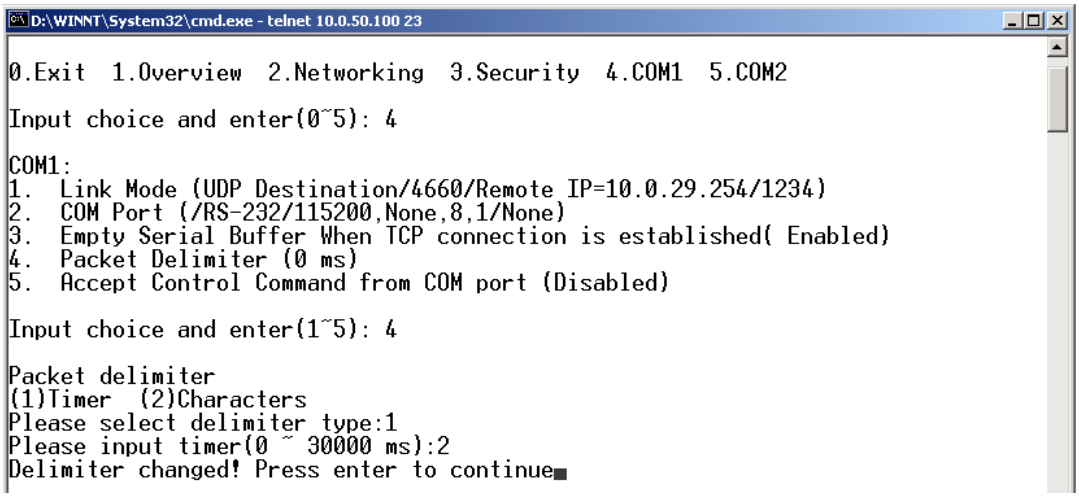
D:\WINNT\System32\cmd.exe - telnet 10.0.50.100 23
0.Exit 1.Overview 2.Networking 3.Security 4.COM1 5.COM2
Input choice and enter(0~5): 4
COM1:
1. Link Mode (UDP Destination/4660/Remote IP=10.0.29.254/1234)
2. COM Port (/RS-232/115200,None,8,1/None)
3. Empty Serial Buffer When TCP connection is established(Enabled)
4. Packet Delimiter (0 ms)
5. Accept Control Command from COM port (Disabled)
Input choice and enter(1~5): 4
Packet delimiter
(1)Timer (2)Characters
Please select delimiter type:1
Please input timer(0 ~ 30000 ms):2
Delimiter changed! Press enter to continue

Fig. 20. Setting packet delimiter timer

One may also choose character pattern as the packet delimiter indicated in Fig. 21

D:\WINNT\System32\cmd.exe - telnet 10.0.50.100 23
0.Exit 1.Overview 2.Networking 3.Security 4.COM1 5.COM2
Input choice and enter(0~5): 4
COM1:
1. Link Mode (UDP Destination/4660/Remote IP=10.0.29.254/1234)
2. COM Port (/RS-232/115200,None,8,1/None)
3. Empty Serial Buffer When TCP connection is established(Enabled)
4. Packet Delimiter (2 ms)
5. Accept Control Command from COM port (Disabled)
Input choice and enter(1~5): 4
Packet delimiter
(1)Timer (2)Characters
Please select delimiter type:2
Please input pattern(max 2 bytes, ex:0x0d0a):

Fig. 21. Setting packet delimiter-character pattern

STE-502C also is designed to accept serial control commands directly over Ethernet following the RFC2217 format. For more detail ,contact our Technical Support.

3.3 Configuring Using Web Browser

1. Make sure the PC is on the same network as STE-502C
2. Open a web browser, then Enter in the same IP address as the STE-502C. The default user name is **admin** and the default password is null **(leave it blank)**.
3. The STE-502C's network, link mode and COM ports settings can be configured on different web pages.
4. Click "***Save Configuration***" to save settings.
5. Click "***Restart***" button to initial the change.

To modify settings through the web server interface, follow the steps below.

3.3.1 Log in

1. While on the web browser, Enter in the IP address of STE-502C of the URL.
   Example: http://10.0.50.100
2. The following authentication screen shall appear (Fig. 22) Enter desired **user name** and **password** then click on OK. The default user name is **admin** and the default password is null(left it blank).

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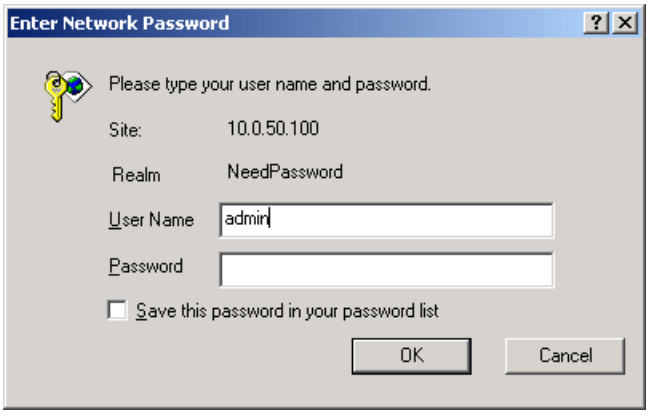

Fig. 22. login the system via Web

3 The following overview screen shall appear (Fig. 23)

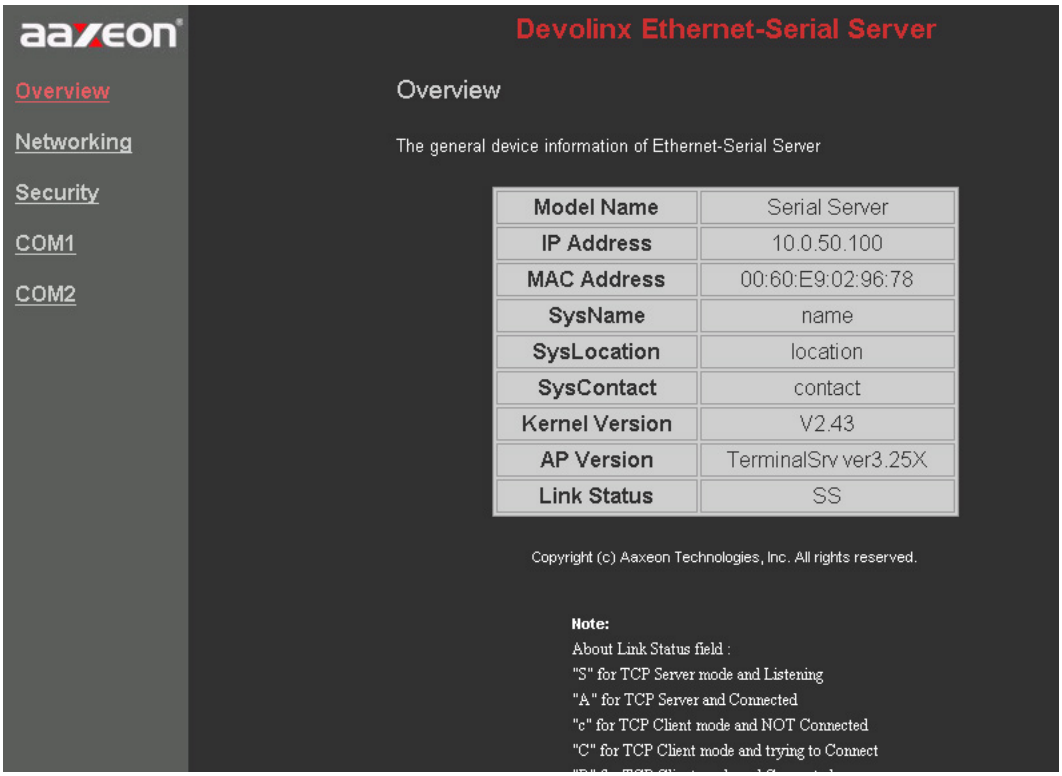

Fig. 23. Overview

3.3.2 Changing password

1. Click on the "***Security***" link and the following screen shall appear (Fig. 24)

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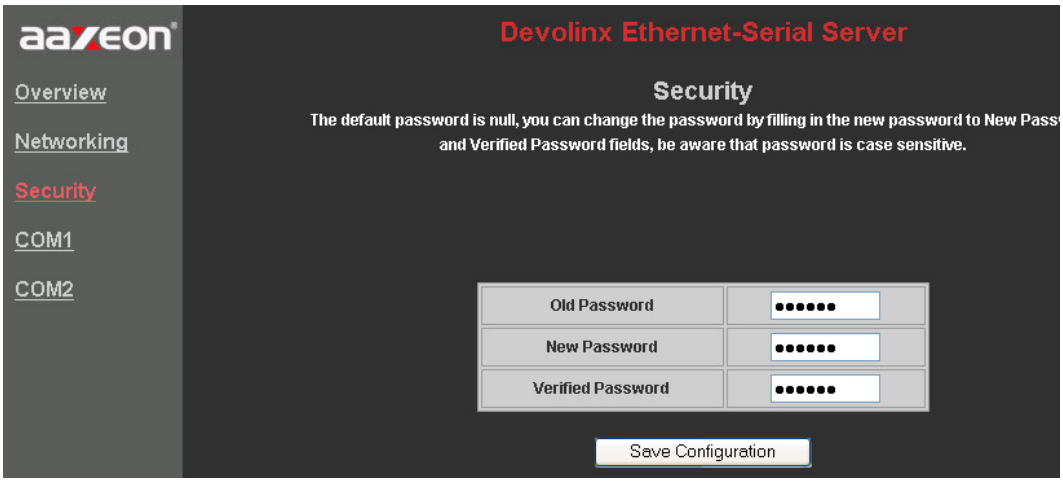

Fig. 24. Change the password

2. Enter the old password on "***Old Password***" field; enter the new password on "***New Password***" and the "***Verified Password***" fields, and then click on "***Save Configuration***" to update the password.
   Note: One may press the **reset key** on the product to reset password to the default value.

3.3.3 Networking

Click on ***"Networking"*** link and the following screen (Fig. 25) shall appear. Fill in IP information on the **TCP/IP** field. Alternatively, click on **DHCP** to obtain **auto IP address, gateway and subnet mask**. Enable SNMP by checking "***Enable***"; fill in network identification information on **SNMP** and click on the "**Save Configuration**" button to save the changes. The changes will not become effective until STE-502C is restarted (Fig. 25)

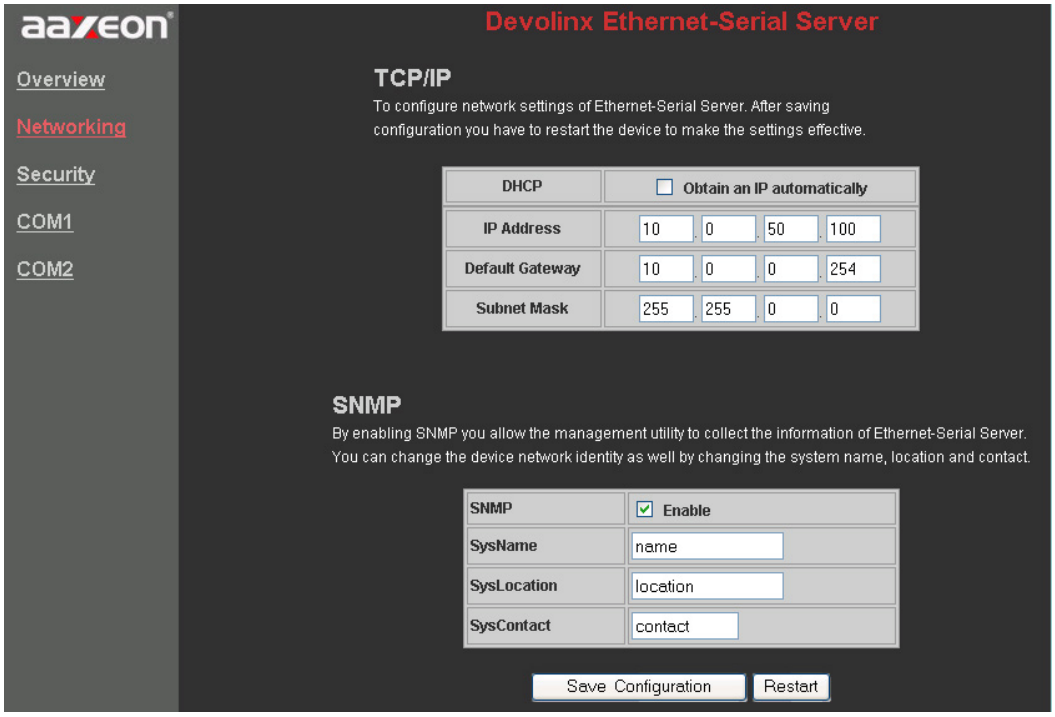

Fig. 25. Network setup

3.3.4 Configuring STE-502C as TCP server：

STE-502C is configured in a transparent mode by default (Fig. 26)

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➔ Click on ***"COM1"*** link and the following screen shall appear.
➔ Configure STE-502C as TCP server
➔ Input local listening port "***4660***"

1.**To enable IP filter：**

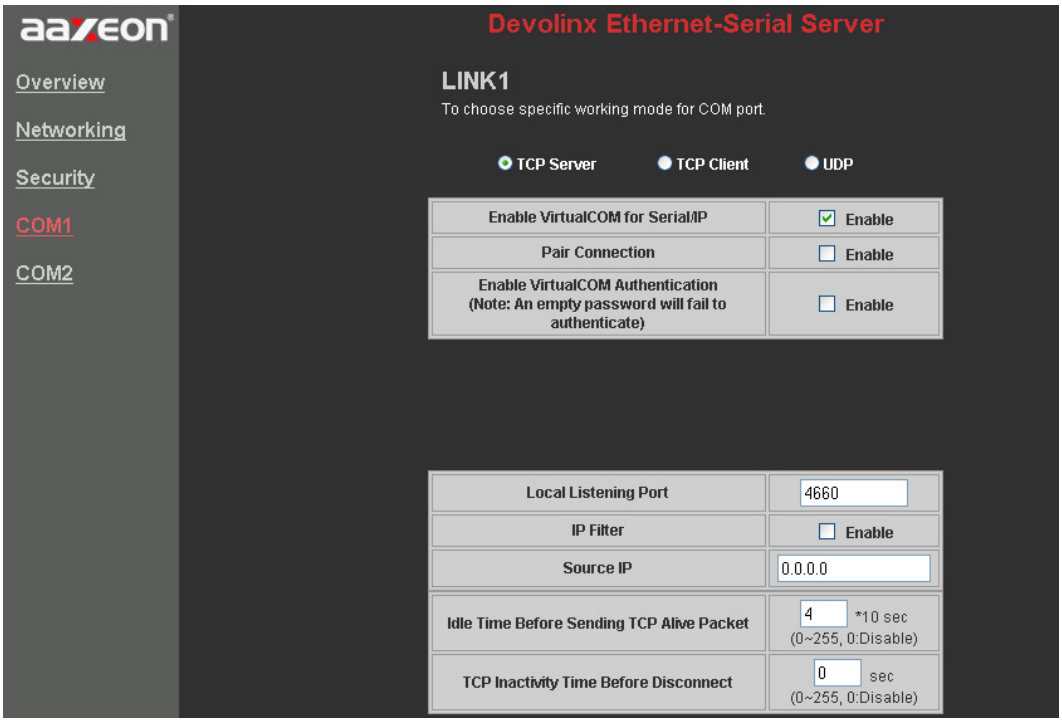
➔ Check "***IP filter***"
➔ Input source IP on "***Source IP"***

2.**If not to enable IP filter：**

➔ Don't check "***IP filter***"
➔ Input idle time on "***Please input idle time to send TCP keep-alive packet(sec)：***"(**2**->the sending TCP keep-alive packet period will be 2*10 sec)
➔ Input TCP Inactivity time in "***TCP Inactivity Time Before Disconnect(sec)：***"(**2**->TCP Inactivity beyond 2 sec will cause disconnect)
➔ Click on "***Save Configuration***" button to save the changes

Notes:

1. One may configure COM1 or COM2 parameter by choosing COM1 or COM2 Link
2. IP filtering function is disabled by setting FILTER_IP to "0.0.0.0".
3. IP filter is disabled by default
4. If IP filter is enabled, only source IP assigned is connected to STE-502C.



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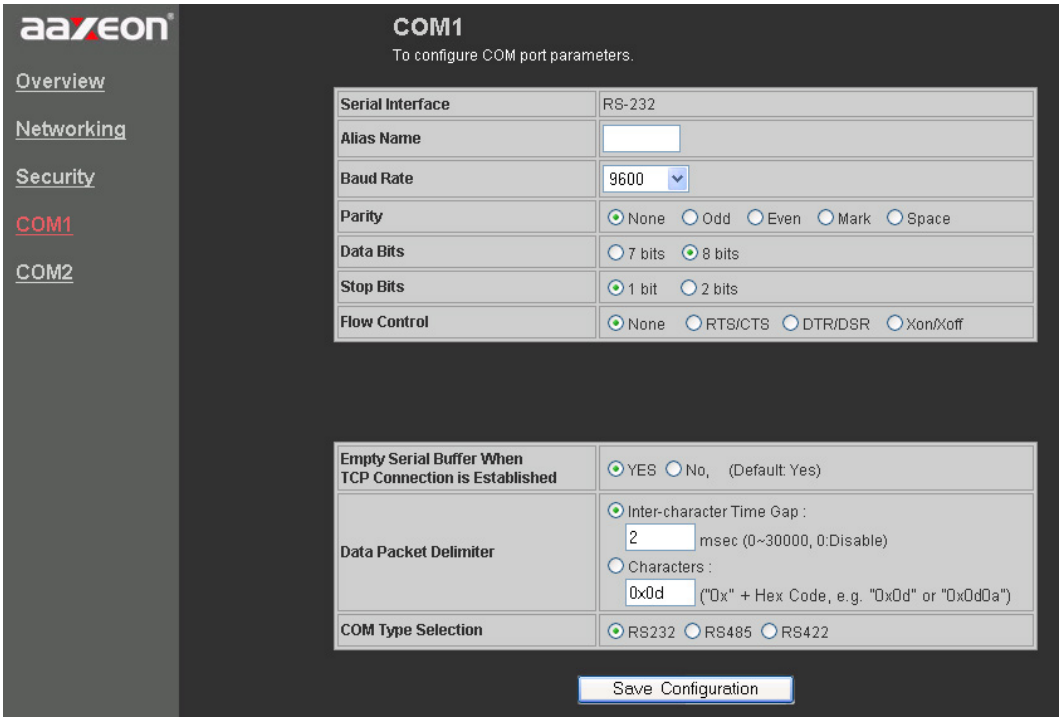

Fig. 26. Com1 setup-TCP server

Notes:

1. Default COM1 of STE-502C is 4660 (COM2 is 4661) and it is associated with the serial port COM1 or COM2. After the application program being connected to the TCP port 4660 on the STE-502C, data of ones application program are transparent to both COM1 and STE-502C.
2. The serial interface may have different port interfaces for different models.

3.3.5 Configuring STE-502C as TCP client：

➔ Configure STE-502C as a TCP client. For example, the destination IP is 10.0.29.11, and the destination port is 4660 (Fig. 27)

➔ On **destination IP, enter** "***10.0.29.11***"

➔ On destination port, enter "***4660***"

➔ Input idle time on "***Please input idle time to send TCP alive packet (sec) :*** "(**4**->the sending TCP keep-alive packet period is 4*10 sec)

1. Select "***TCP Connect On Power-on***" : It keeps trying to establish TCP connection after Power on
2. Select "***TCP Connect On Any Serial Character***" : Any serial character will trigger to establish TCP connection

➔ Input idle time to disconnect on "***Serial Inactivity Time before disconnect (0sec , 1~255) :***" (**0**->disable the function; **2** -> serial Inactivity beyond 2 sec will cause disconnect)

➔ Input error retrying time on "***Waiting Time Between Re-connect Attempts (0 minute,1~255) :*** " (**0**->disable the function; **2** ->STE-502C trying to reconnect per 2 minutes)

➔ Click on "***Save Configuration***" button to save the changes

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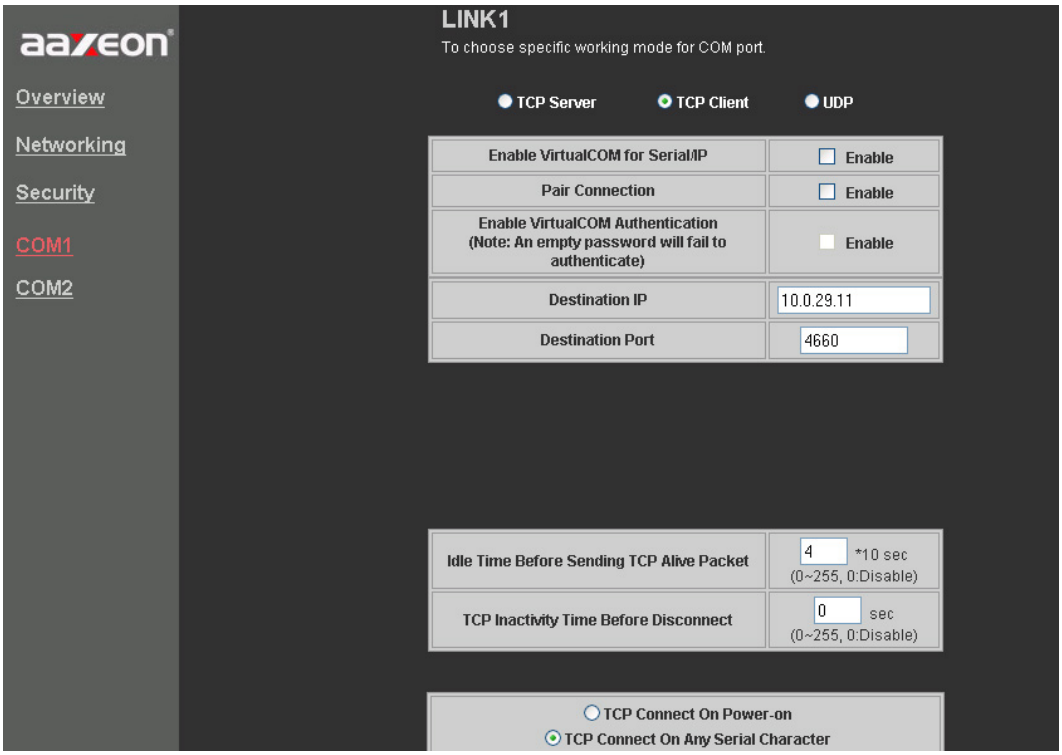

Fig. 27. Com1 setup-TCP client

3.3.6 Pair Connection(Tunneling Mode)

Pair connection is for two or more serial connections with their own STE-502C's to send data over Ethernet to communicate with each other. To do so, choose "***pair connection***" indicated in Fig. 28

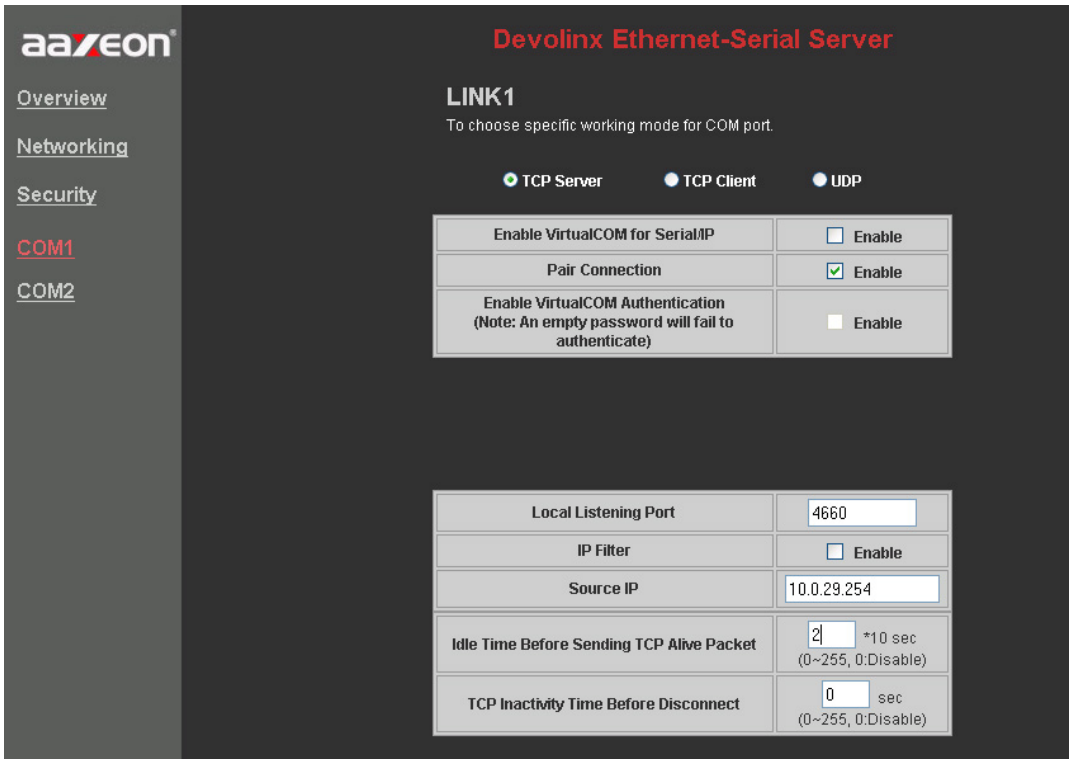

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Fig. 28. Com1 setup –pair connection

3.3.7 Configuring STE-502C in UDP mode：

STE-502C can be configured on a UDP mode to establish connection using unicast or broadcast data from the serial device to one or multiple host computer. Vice versa is also true.

There are 2 UDP communication Modes：

1. **Master (Client) Mode :** To establish a connection using unicast or broadcast data from the serial device to one or multiple host computer.

   Note：The configuration is limited by **Destination IP** and **Destination Port**

   Using broadcast data from a serial device to multiple host computers：For example, for **Destination IP** "**10.255.255.255**"and **Destination Port** "**1234**", the host computer's IP addresses from 10.0.0.1~10.255.255.254 and **Listening Port** at **4660** can receive data sent from the serial device (Fig. 29)

   Note：Broadcast IP address is limited by the Class of IP address and subnet mask. As an example, for a network of Class C subnet 192.168.1.X and a subnet mask of 255.255.255.0, one may configure the broadcast IP address to be 192.168.1.255 (Fig. 31)

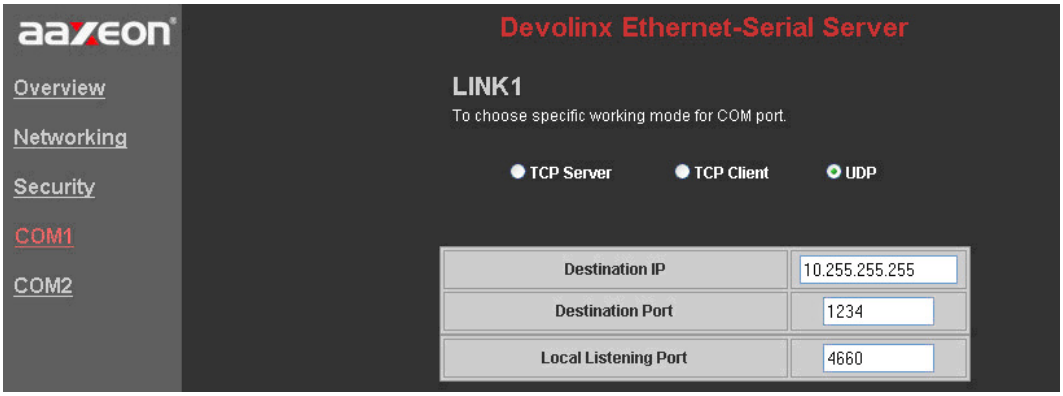

Fig. 29. Com 1 setup –UDP mode

➔ On "**destination IP**" enter "**10.0.255.255** "
➔ On "**destination port** " enter "**1234**".
➔ **On "Local port** " enter "**4660**".
➔ Click on "***Save Configuration***" to save the changes.

Note：If the update is successful, the following screen shall appear (Fig. 30)

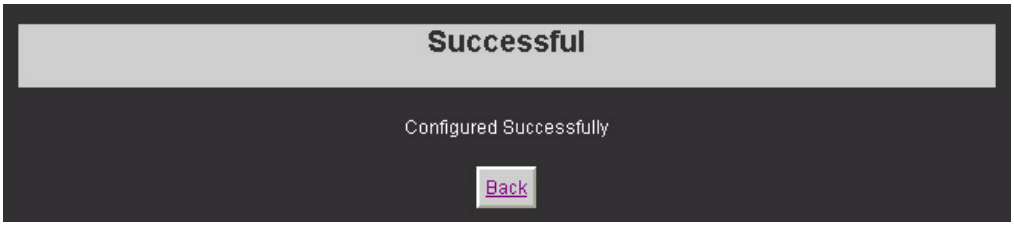

Fig. 30. Configuration successfully updated

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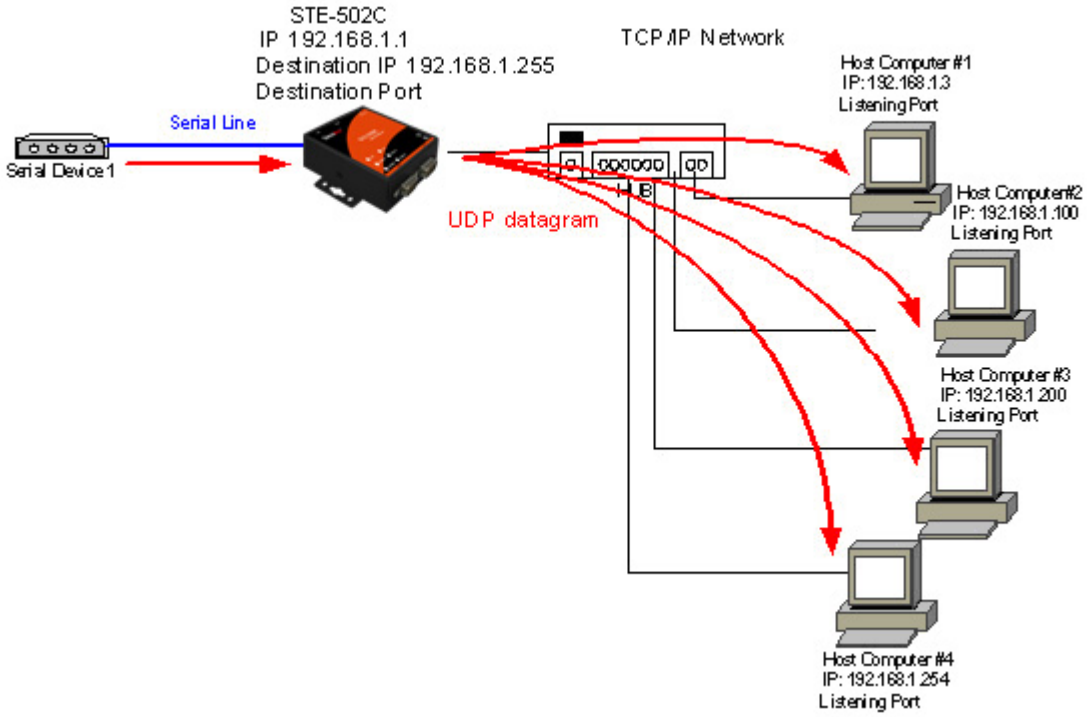

Fig. 31. Data Transmission in a UDP Master(Client) Mode

2. **Slave (Server) Mode：**To establish a connection using unicast or broadcast data from one or multiple host computer to a serial device.(Fig. 32)

Notes：The configuration is limited by the Local Listening Port (For example, on the STE-502C listening the port is 4660 which receives data from the Host Computer).

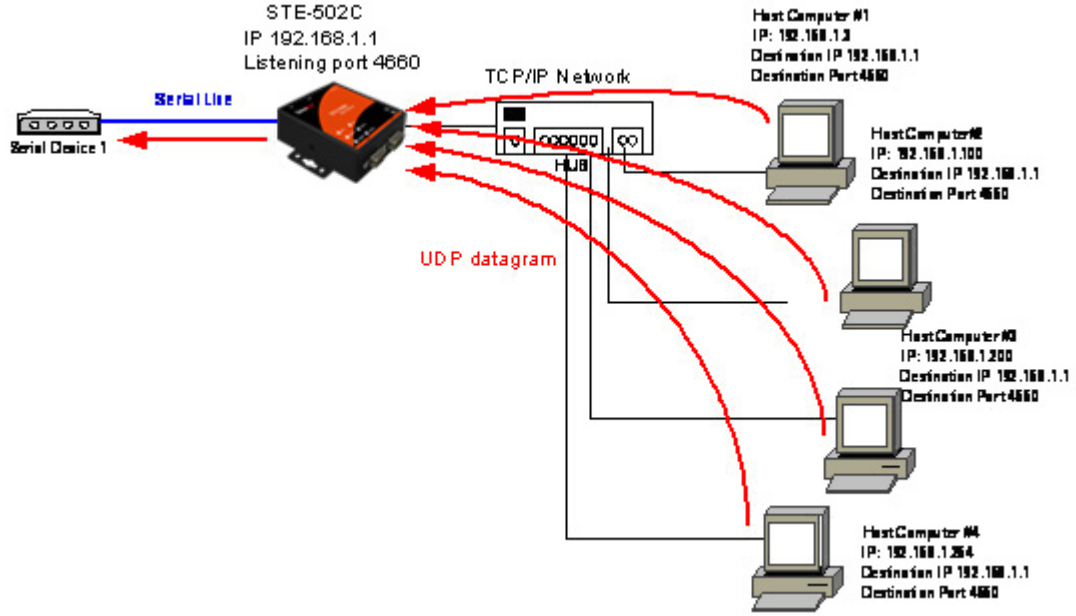

Fig. 32. Data Transmission in a UDP Slave(server) Mode

3.4 Assigning new IP Address with ARP commands

ARP (address resolution protocol) commands can be used to assign a static IP address on STE-502C using

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its hardware MAC (media access control) address. The MAC address"0060E9-xxxxxx" is printed on the rear side of device . The following shows how it works on MS-DOS command prompt window.
Example: change IP from 10.0.50.100 to 10.0.50.101,and MAC address being 00-60-e9-11-11-01

Step1: Add the new host IP to the ARP table

➔ Open Ms-DOS command prompt window

➔ Input **arp -s 10.0.50.101 00-60-E9-11-11-01**(Fig. 33)

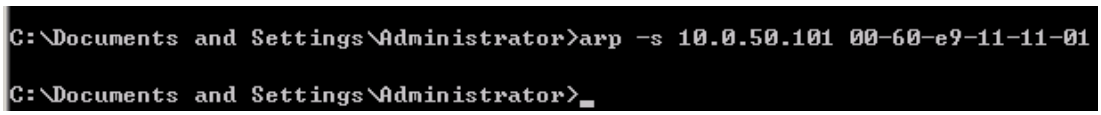

Fig. 33. Ms-DOS command prompt window: add host computer IP to ARP table

Step2: Change to the new IP via Telnet port 1(Fig. 34)

➔ Input **telnet 10.0.50.101 1**

Note：Telnet will fail and then STE-502C restarts automatically. Afterward, the new IP address is changed to 10.0.50.101

Step3: Using the new IP to configure STE-502C via Telnet

➔ Input **telnet 10.0.50.101**

Note:

1. Both PC's IP and STE-502C 's IP must belong to the same subnet.
2. The changed IP address must be legal; otherwise it will change back to the default value (10.0.50.100) after restart.

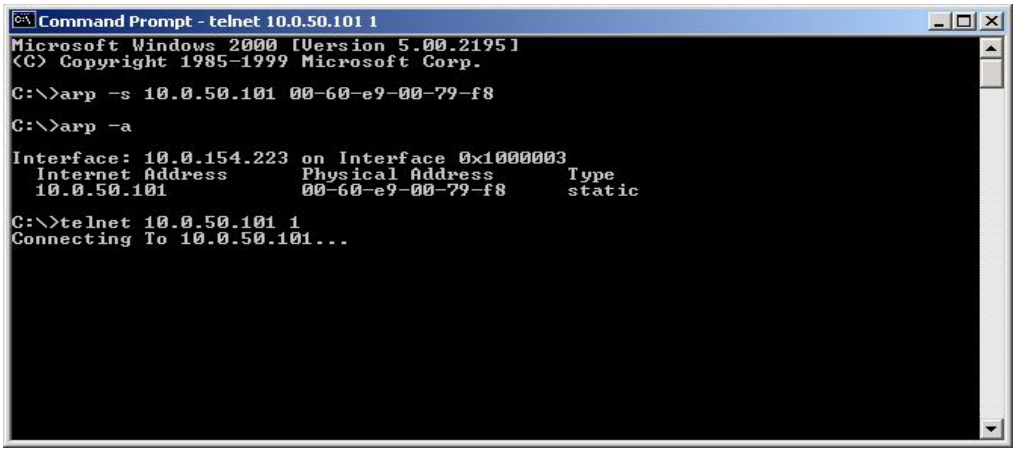
Command Prompt - telnet 10.0.50.101 1
Microsoft Windows 2000 [Version 5.00.2195]
(C) Copyright 1985-1999 Microsoft Corp.
C:\>arp -s 10.0.50.101 00-60-e9-00-79-f8
C:\>arp -a
Interface: 10.0.154.223 on Interface 0x1000003
Internet Address Physical Address Type
10.0.50.101 00-60-e9-00-79-f8 static
C:\>telnet 10.0.50.101 1
Connecting To 10.0.50.101...

Fig. 34. Assigning a new IP address with ARP command

4. USING VIRTUAL COM

Virtual COM driver mode for windows converts COM data to LAN data for control of the COM port on STE-502C via LAN. By creating virtual COM ports on the PC, the Virtual COM driver redirects the communications from the virtual COM ports to an IP address and port number on a STE-502C that connects the serial line device to the network. Fig. 35 illustrates a Virtual COM connection diagram.

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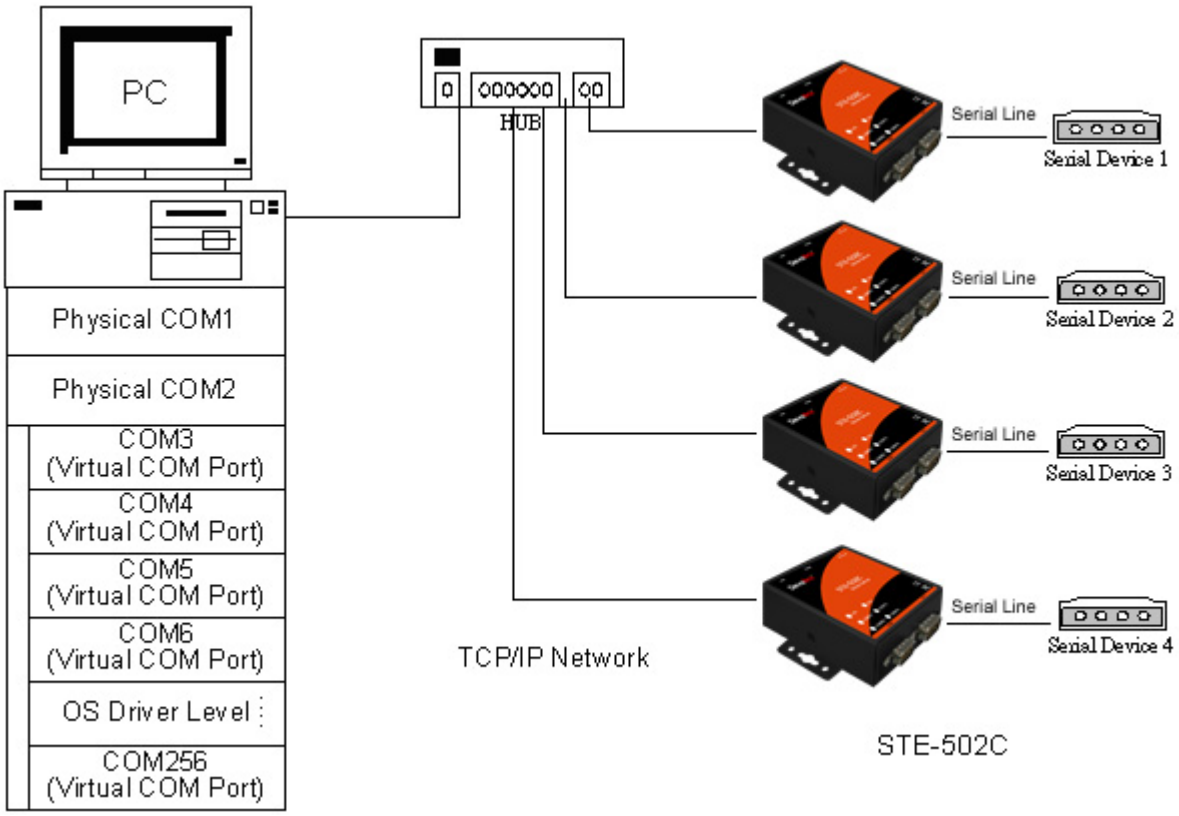

Fig. 35. Virtual Com connection diagram

4.1 Setup of a virtual COM driver

4.1.1 PC requirements

- Processor: Intel-compatible, Pentium class or faster
- Operation system: Windows Server 2003, Windows XP, Windows 2000, Windows NT 4.0 SP5 or later, Windows Me, Windows 98, Microsoft NT/2000 Terminal Server, Citrix MetaFrame

4.1.2 Cautions on Use

The Virtual COM driver supports firmware AP v3.0 or later for the STE-502C Ethernet Serial Server.

4.1.3 Limitation

The Virtual COM driver provides users with up to 256 Virtual COM ports. Users may select from COM1 to COM256.

4.1.4 Installation

Make sure to turn off all anti-virus software before installation. Run the Virtual COM setup file included in the CD to install Virtual COM driver.

Select one or two COM port to become the Virtual COM ports.

4.1.5 Uninstalling

1. From Windows Start menu select Setting, Control Panel, Add/Remove Programs.
2. Select **Serial IP** in the list of installed software.
3. Click the **Add/Remove** button to remove the program, or From Windows Start menu select Programs, Serial IP, **Uninstall Serial IP** to remove the program.

4.2 Virtual COM communications

4.2.1 Enabling Virtual COM on STE-502C

From the web browser, access STE-502C by typing its IP address. Click on **COM1** link to access COM1 window. On the window, click on "***TCP Server***" and check "**Enable**" button. Then Enter in the local port number on "***Local Port***" field as indicated in Fig. 36

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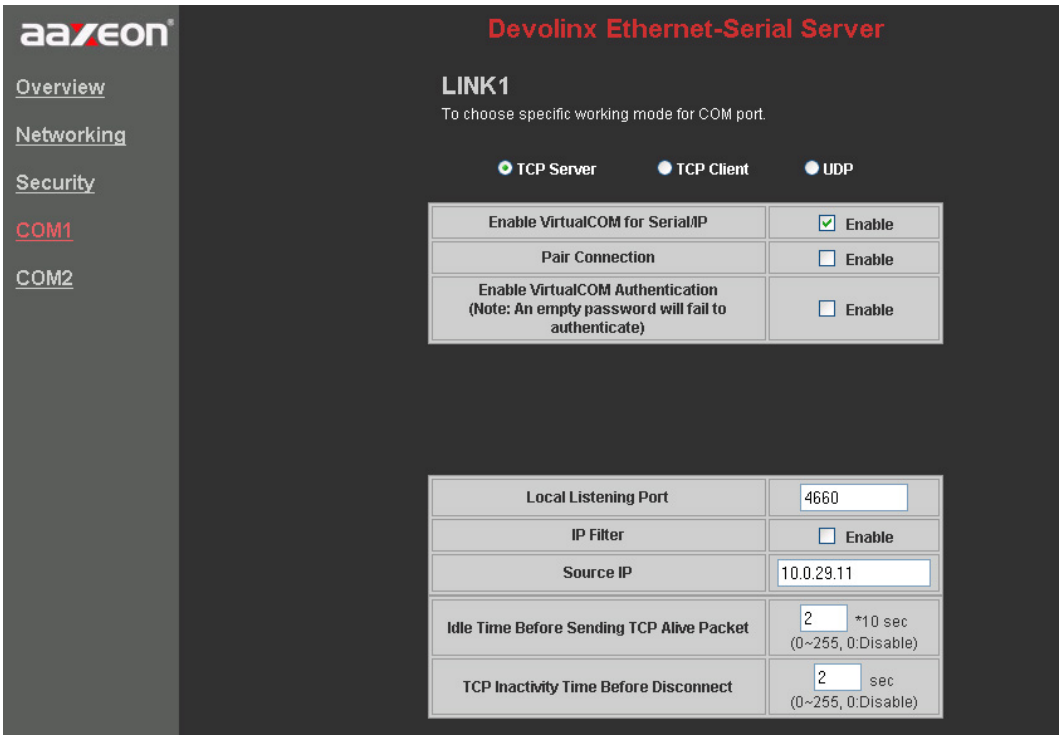

Fig. 36. Enabling Virtual COM port

One may also enable Virtual COM through Telnet by setting COM1 as a TCP server, and Enter in the local port number for COM1, then enable virtual COM as shown in Fig. 37

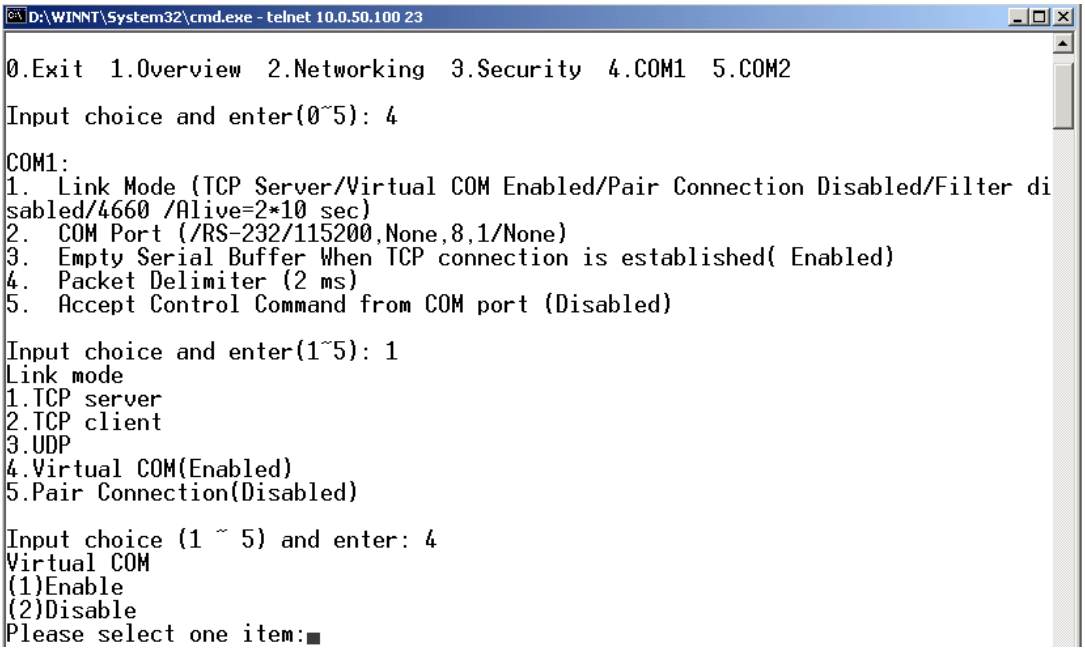
D:\WINNT\System32\cmd.exe - telnet 10.0.50.100 23
0.Exit 1.Overview 2.Networking 3.Security 4.COM1 5.COM2
Input choice and enter(0~5): 4
COM1:
1. Link Mode (TCP Server/Virtual COM Enabled/Pair Connection Disabled/Filter disabled/4660 /Alive=2*10 sec)
2. COM Port (/RS-232/115200,None,8,1/None)
3. Empty Serial Buffer When TCP connection is established(Enabled)
4. Packet Delimiter (2 ms)
5. Accept Control Command from COM port (Disabled)
Input choice and enter(1~5): 1
Link mode
1.TCP server
2.TCP client
3.UDP
4.Virtual COM(Enabled)
5.Pair Connection(Disabled)
Input choice (1 ~ 5) and enter: 4
Virtual COM
(1)Enable
(2)Disable
Please select one item:

Fig. 37. Enabling Virtual COM port via Telnet

4.2.2 Running Serial/IP on monitoring PC

On Window Start Menu, go to \program\serial/IP\control panel\Select Port\, then select the serial port. Then the " Serial I/P Control Panel" window appears (Fig. 38).

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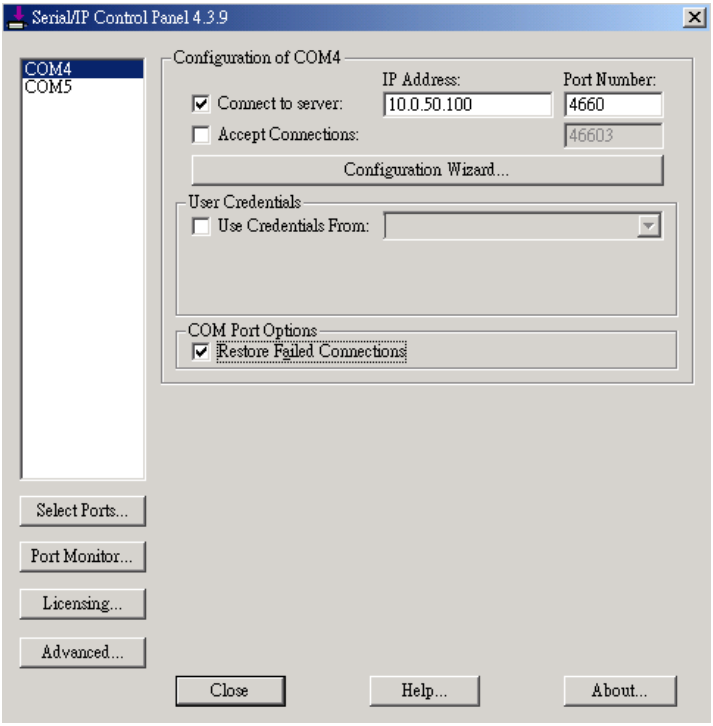

Fig. 38. Serial/IP control panel

On the right of the panel is a sample for COM 4 settings. On the left is the list of the COM ports that have been selected (on **Select Ports** window) for use by the Virtual COM Redirector. Change the list by clicking the **Select Ports** button.
Each COM port has its own settings. When click on a COM port, the Control Panel changes to reflect that the selected port.
Note: COM port changes become effective immediately.

4.3 Configuring Virtual COM Ports

Serial/IP COM port can be changed as follows:(Fig. 39)

1. Select a COM port on the list.
2. On **IP Address of Server**, enter the serial serve IP address.
3. On **Port Number**, enter the TCP port number of the serial server.
4. On **Server Credentials**, the default is **No Login Required**. If the serial server does require login by the Virtual COM Redirector, the Virtual COM Redirector must provide a username and/or password every time an application tries to access the serial server.
5. Click the **Configuration Wizard** button and then click the **Start** button that shall appear on the wizard window. This step verifies that the Virtual COM Redirector communicates with the serial server. If **Log** display does not show errors, click **Use Settings**, return to the Control Panel (Fig. 39)

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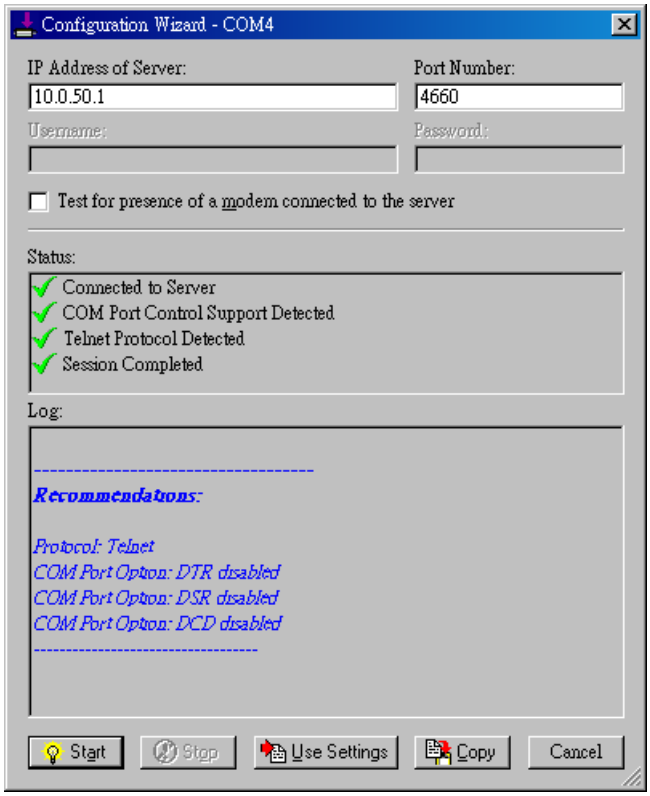

Fig. 39. Configuration Wizard

6. Settings on the **Connection Protocol** must match the TCP/IP protocol supported by the serial server. The Configuration Wizard is capable of determining the correct settings.
7. On **COM Port Options**, the settings must match the COM port behavior expected by the PC application. The Configuration Wizard will recommend such settings.

5. SNMP SETUP

5.1 SNMP Network Management Platform

STE-502C is an SNMP device that allows many popular SNMP Network management platforms such as HP OpenView and SunNet Manager, to conduct monitoring on the device.
Depending on the network management tools used, STE-502C information can be collected from running the management tools, including **IP address, DNS name, system descriptions and NIC** information.

5.2 SNMP Alerts

- Cold/Warm Start
- Link Down
- Link Up
- Authentication Failure

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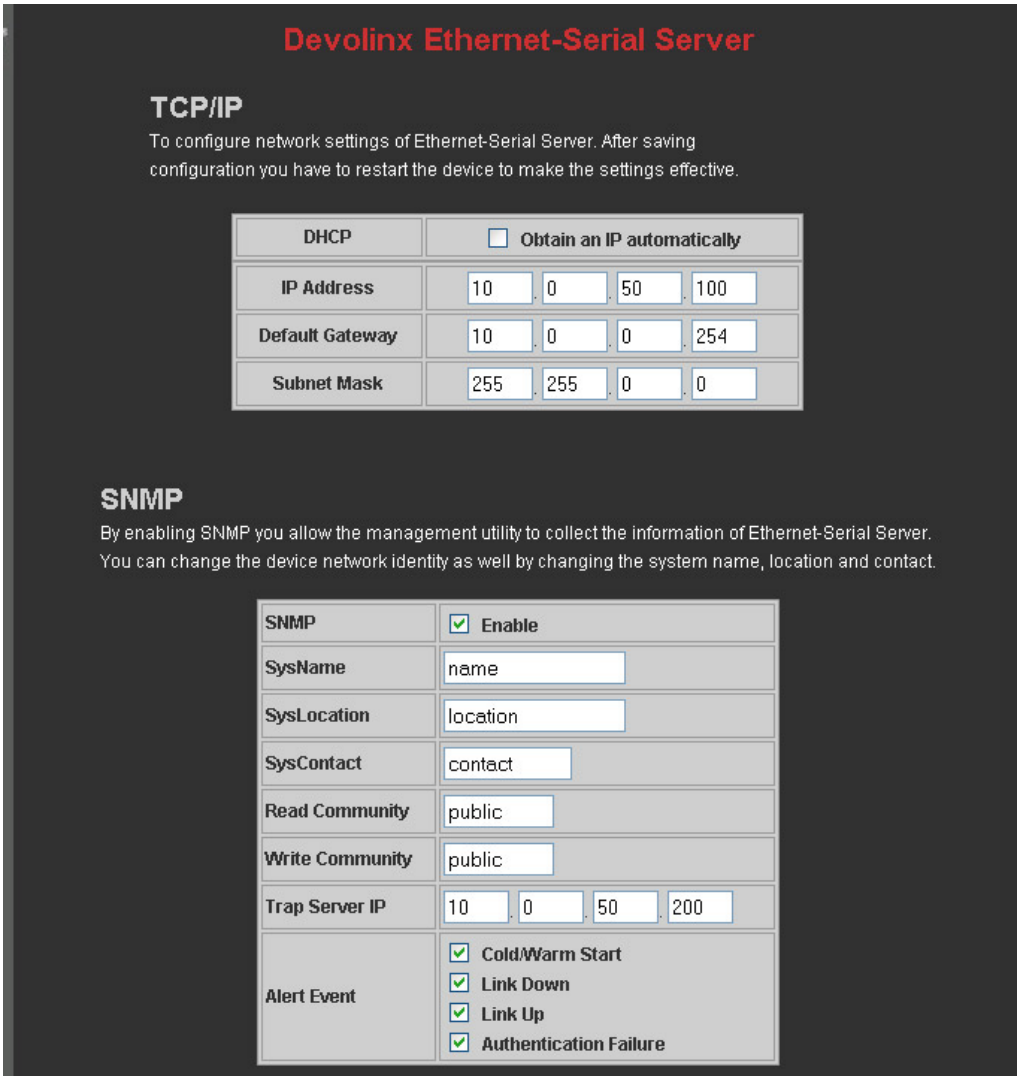

6. WRITING ONES OWN APPLICATIONS

Before writing ones own host applications or programs to interact with STE-502C, make sure one have done the following.

6.1 Preparing System

1. Connect STE-502C to power, Ethernet and serial cables
2. Configure STE-502C: connection type, IP address, gateway IP address, and network mask (see chapter 3 **Hardware Installation**).
3. Configure STE-502C as TCP Server, using the default TCP port number 4660.
4. The host (PC) application program must be configured as a TCP client and connected to STE-502C with designated TCP port number 4660 for COM1.
5. Check STE-502C running status through **monitor.exe** configuration utility.
6. If test OK, begin writing custom application.
   **Refer to your chosen programming language guide for socket application development.*

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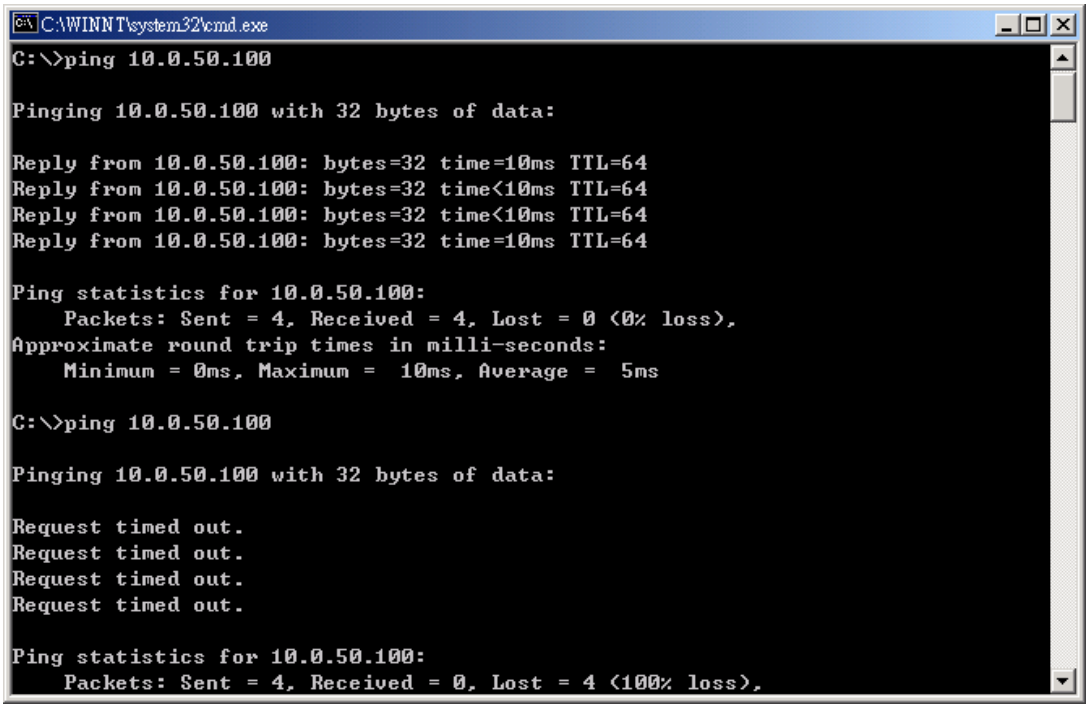
7. DIAGNOSTICS

There are several ways to check the status and availability of STE-502C.

7.1 Using Standard TCP/IP Utility *ping* Command

Go to Windows **Start** menu, select **Run** and Enter in "**ping <TCP Server IP address>**".
If the connection is established, the Reply messages are displayed; otherwise it will indicate Request timed out.

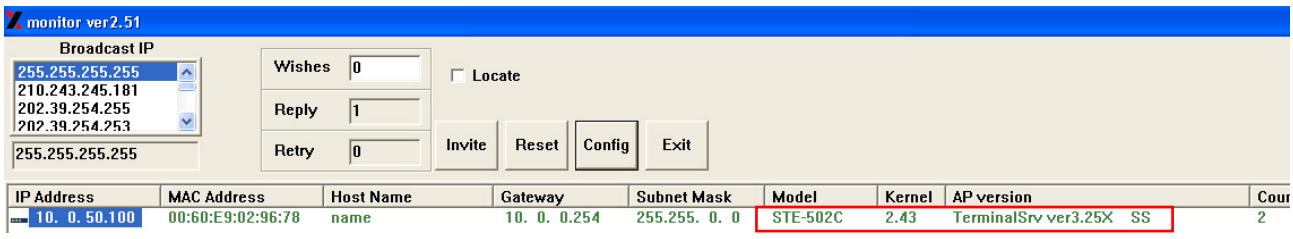

C:\WINNT\system32\cmd.exe
C:\>ping 10.0.50.100
Pinging 10.0.50.100 with 32 bytes of data:
Reply from 10.0.50.100: bytes=32 time=10ms TTL=64
Reply from 10.0.50.100: bytes=32 time<10ms TTL=64
Reply from 10.0.50.100: bytes=32 time<10ms TTL=64
Reply from 10.0.50.100: bytes=32 time=10ms TTL=64
Ping statistics for 10.0.50.100:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 10ms, Average = 5ms
C:\>ping 10.0.50.100
Pinging 10.0.50.100 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 10.0.50.100:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

7.2 Using monitor.exe Configuration Utility Program

Use monitor.exe configuration program on the product CD to check the status of STE-502C. The status can be read from "***AP version***" column of the tool.

Status	Descriptions
S	The system is configured as a TCP Server and Listing.
A	The TCP Server is connected.
C	The system is configured as a TCP Client and not yet connected.
C	The system is configured as a TCP Client and trying to Connect.
B	The TCP Client is connected.
U	The system is configured as an UDP Mode.

For example, **'S'** means that COM1 is in server mode and is not connected.



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APPENDIX A: SPECIFICATION

A.1. Hardware Specification

	Specifications
CPU	• 16-bit Embedded CPU • 100MHz
Flash Memory	• 512K Bytes
SDRAM	• 512K Bytes
EEPROM	• 512 Bytes
Host Communication	• IEEE802.3 base band • TCP/IP, UDP, SNMP, HTTP, Telnet, ARP, BOOTP, DHCP, ICMP
Reset	• Built-in default key to restore factory default settings
Watch Dog Timer	• Software watch dog to auto reset
Serial Port Communication	• Two RS-232 or RS-485/RS-422 selectable • RS-232: EIA-RS-232C standard, Full Duplex, DB9 • RS-485: 2/4 wires, Half/Full duplex, Terminal Block • RS-422: 4 wires, Half/Full duplex, Terminal Block • Parameters 1) Baud-rate: 1200 bps ~ 230400 bps 2) Parity: None, Even, Odd, Mark, Space 3) Data bits: 7,8 4) Stop bits: 1,2 5) Packet Delimiter: by inter-character timeout, by characters delim 6) Flow Control: None, Hardware CTS/RTS, Software Xon/Xoff
LED indication	• RUN x 1 • LAN x 1 • COM port x 4
Power Requirement	• +9~30VDC Jack or DC +9~30V Terminal Block, 2.8 Watt Max
Temperature	• Operation: 0℃ to 60℃ • Storage: -20℃ to 70℃
Humidity	• 20%~90% non-condensing
Housing	• 90mm(L) x 45mm(W) x 63mm(H)

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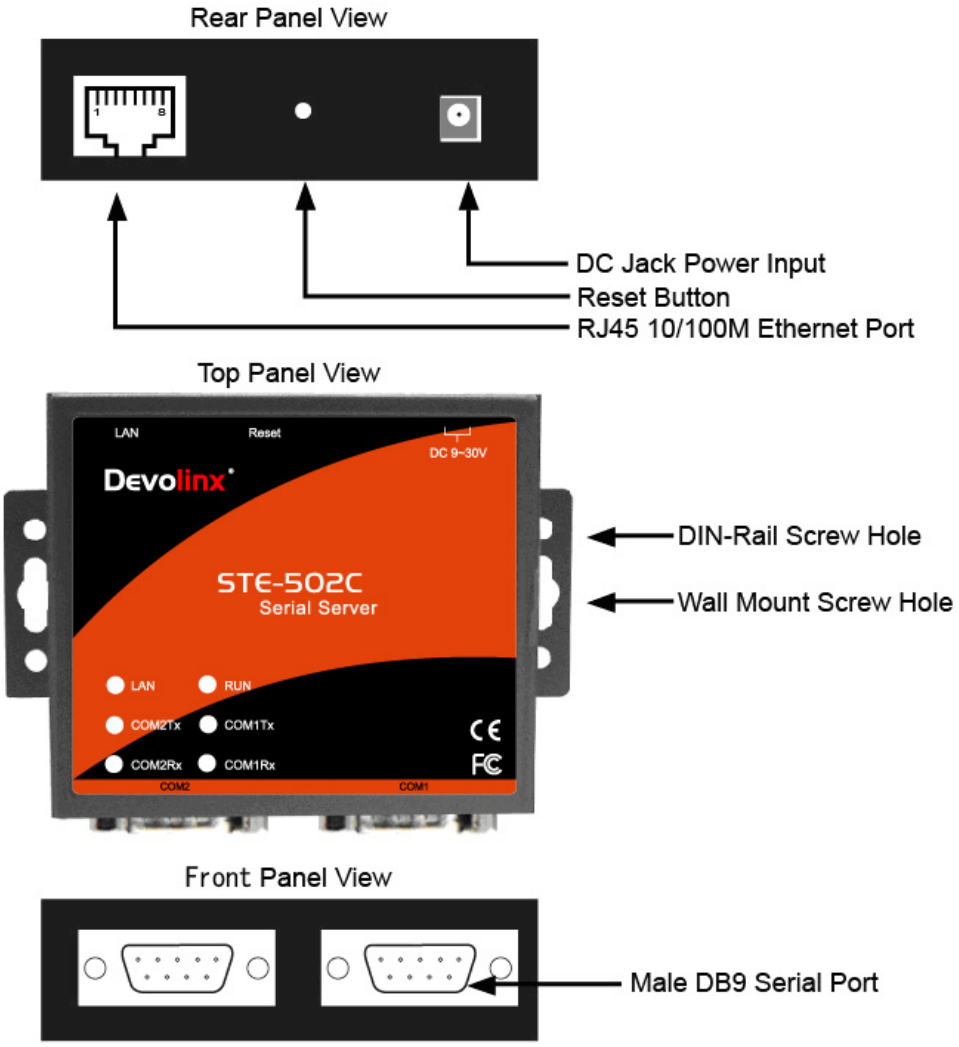
A.2. Software Specification

Item	Specifications
Protocol	TCP, UDP, ARP, ICMP, SNMP, HTTP, Telnet, BOOTP, DHCP
Configuration	• Configuration information for both TCP/IP and serial ports is written in the EEPROM. • Configuration utilities of Windows 98/2000/NT/XP/2003 are provided.
Internal Buffer Size	• TCP receiving buffer size = 8K bytes • TCP transmitting buffer size = 16K bytes • RS-232 or RS-485/RS-422 receiving buffer size = 4K bytes • RS-232 or RS-485/RS-422 transmitting buffer size = 4K bytes

A.3 Panel Layout and Connector Pin Assignments

A.3.1. Panel Layout

A.3.1.1 DB9 for STE-502C (RS-232/RS-422/RS-485)



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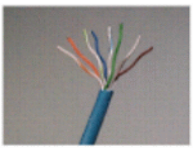
A.3.2.1 DB9 Pin Assignments

The pin assignments of DB9 connector on STE-502C are shown in the following table:

Pin#	**RS-232** **Full Duplex** for STE-502C Model	**RS-485** **2 wire, Half Duplex** for STE-502C Model	**RS-485/422** **4 wire, Full Duplex** for STE-502C Model
1	DCD	N/A	N/A
2	RXD	N/A (reserved)	**TXD+**
3	TXD	**DATA+**	**RXD**+
4	DTR	N/A	N/A
5	SG (Signal Ground)	SG (Signal Ground)	SG (Signal Ground)
6	DSR	N/A	N/A
7	RTS	**DATA-**	**RXD-**
8	CTS	N/A (reserved)	**TXD-**
9	N/A	N/A	N/A

A.3.3 Ethernet Port (RJ-45) Pin Assignments

1. Category 5 UTP cable, 8 core wire.



2. RJ45 Connector.

3. RJ45 Pin Assignment

Pin Assignment	**568A** Definition	**568B** Definition
Pin1	Green-White	Orange-White
Pin2	Green	Orange
Pin3	Orange-White	Green-White
Pin4	Blue	Blue
Pin5	Blue-White	Blue-White
Pin6	Orange	Green
Pin7	Brown-White	Brown-White
Pin8	Brown	Brown

canon RJ-45, choose either 568A or 568B definition. Use 568A and 568B definition, respectively for a crossover cable,

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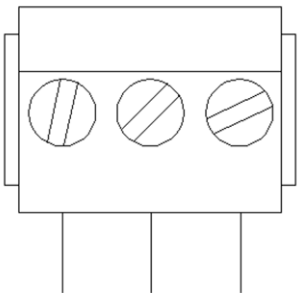

F.G. VIN- VIN+

Note: Device will not be damage if the polarity is reverse.

A.4 Buzzer/LED Message

A.4.1 Buzzer

" ^ ": Beep twice

" = ": Beep off

Message	Description
^===^===^===^===^===^===^...	Watchdog problem, return service is required
(1sec)	
^^^^^^^^^^^^^^^^^^^^^^^^...	Memory problem, return service is required
^==^========^^	Startup OK but AP firmware is disabled
(5sec)	
^==^========^^^	Startup OK and AP firmware is enabled
(5sec)	

Table 1. Buzzer Message

A.4.2 LAN

Message	Description
LED Off	Ethernet Disconnected
LED blinking with Green	Data is transmitting on Ethernet for 100Mbps
LED blinking with Orange	Data is transmitting on Ethernet for 10Mbps

Table 2. LAN LED Message

A.4.3 COM Port

Message	Description
COM1(2) TX LED off	No data is transmitting on COM port
COM1(2) TX LED on blinking state	Data is transmitting on COM port
COM1(2) RX LED off	No data is receiving on COM port

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COM1(2) RX LED on blinking state	Data is receiving on COM port

Table 3. COM Port LED Message

A.4.4 RUN

Message	Description
LED on	Jumper JP1 pin1 and pin2 are shorted to disable AP firmware in the flash memory.
LED blinking (rate: 0.5Sec)	AP firmware is running

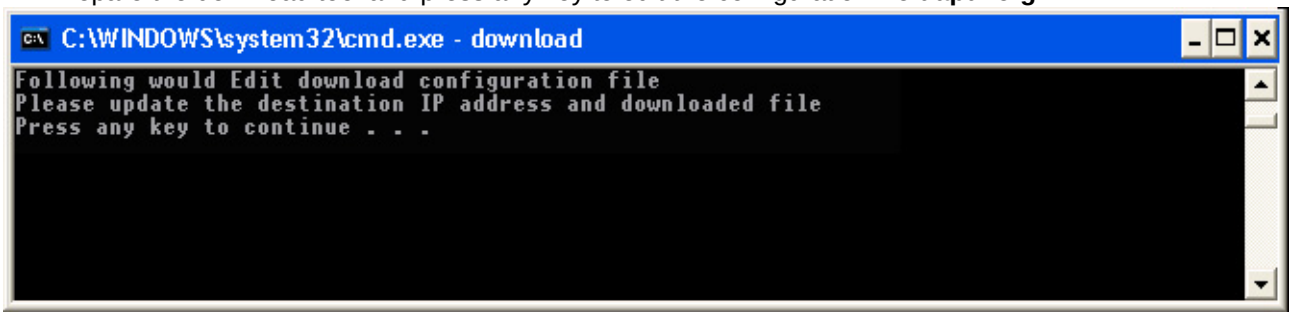
Table 4. RUN LED Message

APPENDIX B: UPGRADING SYSTEM FIRMWARE

New version of firmware can be downloaded from www.aaxeon.com

B.1 System Upgrading Procedure

1. Make sure the PC and the STE-502C are on the same network. Use command **ping** or **monitor.exe** utility program to verify their availability.
2. Prepare the download tool and press any key to edit the configuration file **dapdl.cfg**.

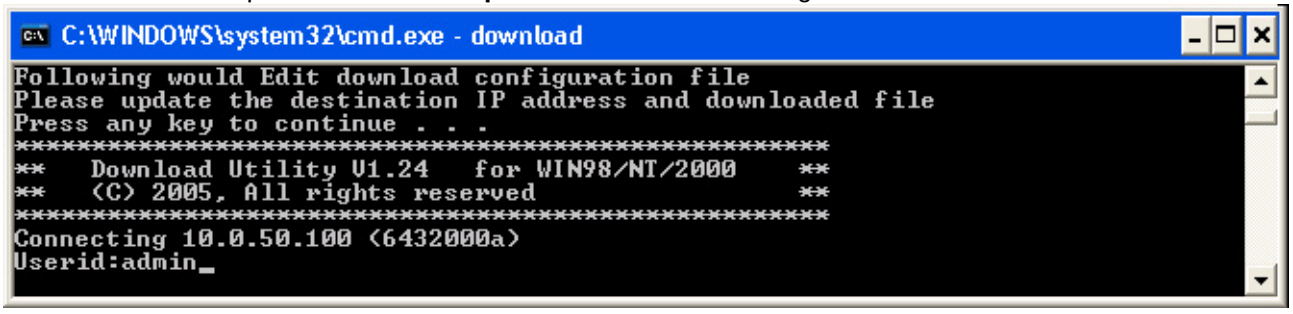

C:\WINDOWS\system32\cmd.exe - download
Following would Edit download configuration file
Please update the destination IP address and downloaded file
Press any key to continue . . .

3. Edit **"dapdl.cfg"** to fit the system requirements, the contents of the file shall look like the following window. Be sure to save your modifications.

   Remote_IP 10.0.50.100

   Load file_name.hex

   The first line identifies the IP address of STE-502C; the second line identifies the firmware (.Hex file) name to be downloaded.
4. Run **download.bat,**
5. Input **user name** and **password** credential to begin new firmware download.


C:\WINDOWS\system32\cmd.exe - download
Following would Edit download configuration file
Please update the destination IP address and downloaded file
Press any key to continue . . .
****
** Download Utility V1.24 for WIN98/NT/2000 **
** (C) 2005, All rights reserved **
****
Connecting 10.0.50.100 (6432000a)
Userid:admin

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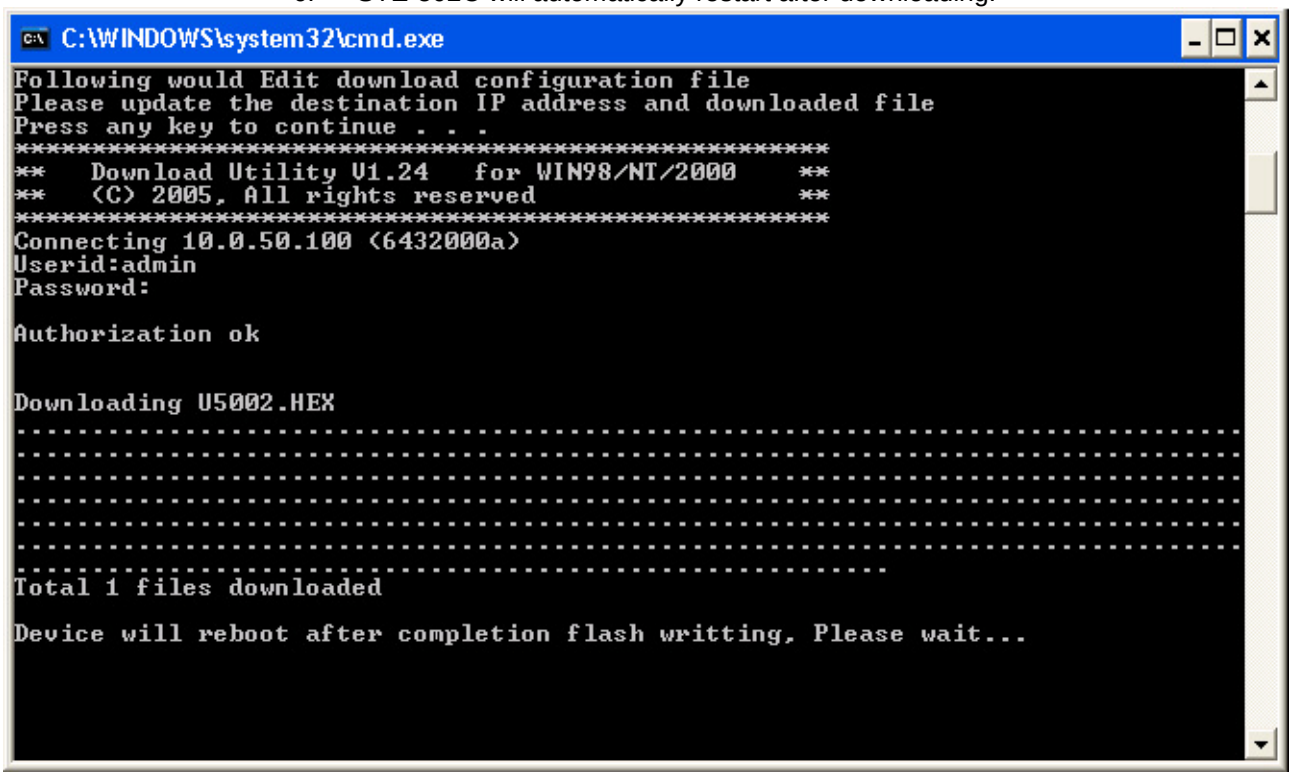
6. STE-502C will automatically restart after downloading.


C:\WINDOWS\system32\cmd.exe
Following would Edit download configuration file
Please update the destination IP address and downloaded file
Press any key to continue . . .
** Download Utility V1.24 for WIN98/NT/2000 **
** (C) 2005, All rights reserved **
Connecting 10.0.50.100 (6432000a)
Userid:admin
Password:
Authorization ok
Downloading U5002.HEX
Total 1 files downloaded
Device will reboot after completion flash writting, Please wait...

B.2 Critical Issues

1. The upgrading process can be aborted by pressing the **<Esc>** key. STE-502C will restart automatically and the system remains the same.
2. If STE-502C does not receive any upgrading data within **30 seconds**, it will restart automatically and the system remains the same.
3. After the upgrading process is done, STE-502C will program the flash memory, and the buzzer beeps 6 times before restarting. It takes around 10 seconds to complete the programming process. If an error occurs during the programming process, STE-502C will clear the corresponding memory and the system remains the same before the process.

B.3 Error Messages

Firmware upgrade may not be successful if errors occur during the process.

Error Cause	Message	Comments
Illegal Hex file format	Hex File Text Error	
	Hex File Check-Sum Error	
	Hex File Format Error	
	Hex File End of Record Error	
STE-502C handshaking problem	STE-502C ACK Start Address Error	
	STE-502C ACK Length Error	
	STE-502C Response Command Error	
Configuration file	Remote IP not found	
	Open configuration file failure	

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APPENDIX C: RE-LOADING SYSTEM FIRMWARE

The AP (application program) firmware of STE-502C can be disabled If a wrong version is downloaded. To disable the current version of firmware and re-load the correct one, do the followings:

1. Turn power off, open STE-502C case.
2. Short pin1 to pin2 on jumper JP1 (on the right-top corner of the main board) to disable the current AP firmware.
3. Turn STE-502C power on.
4. Download the correct AP firmware. .
5. Open pin1 and pin2 on jumper JP1 to enable AP firmware.
6. Close the case and continue operations.

APPENDIX D: RUNNING MONITOR.EXE UTILITY

The configuration utility **monitor.exe** is the main utility program used to display and to configure STE-502C settings.

D.1 Running Monitor.exe utility

Start the program under Windows 98/NT/2000 environment and the following window shall appear(Fig. 40).

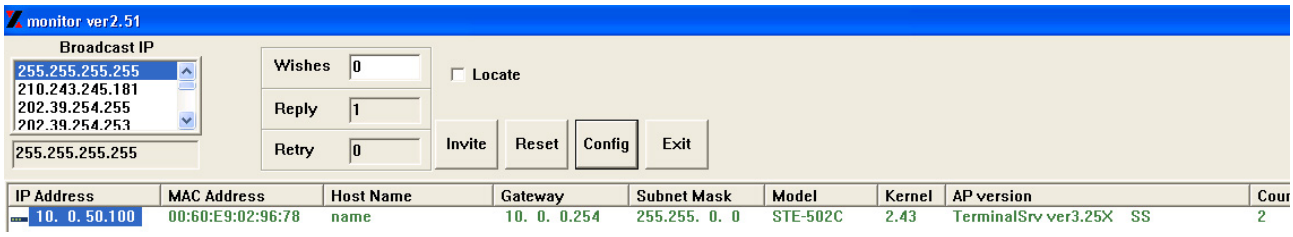


Fig. 40. Main window of monitor.exe utility program

D.2 Detecting Operational Devices

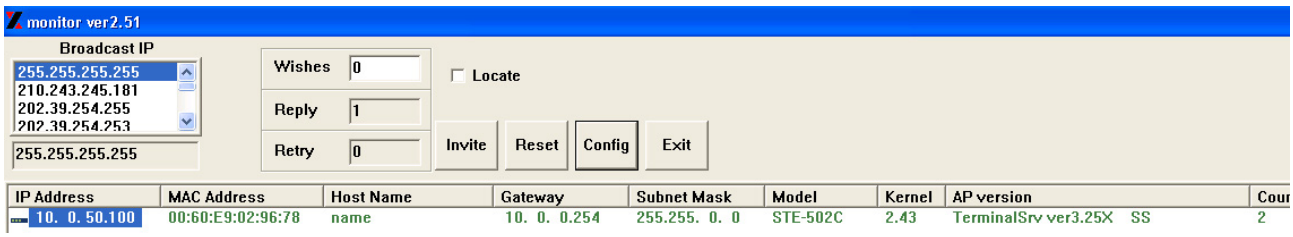
Follow steps below to detect all devices currently available on the network.

1. Start **monitor.exe** utility program.
2. Select an item from the **Broadcast IP** list.
3. Specify a number on **Wishes** box.
4. Click on the **Invite** button. This will display all the devices requested.

D.3 Configuring Devices

Use **monitor.exe** to configure the settings of devices on the network.

1. Repeat the steps in **D.2** to bring up devices information.
2. Select the device to be configured from **IP Address**. Click on the "***Config***" button, a configuration dialog box will popup as shown in Fig. 41:



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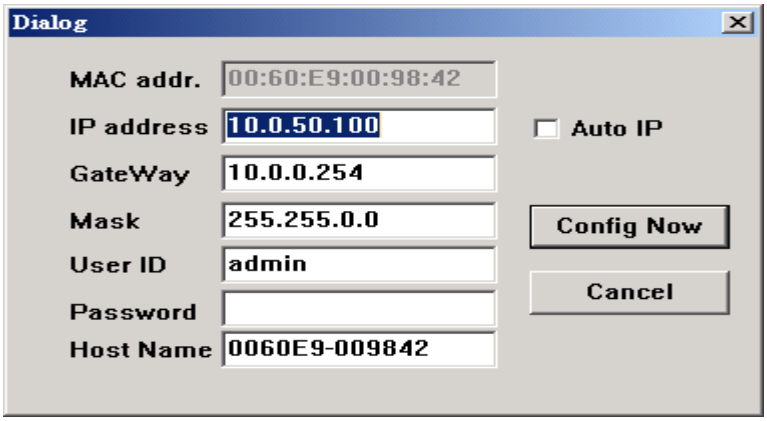
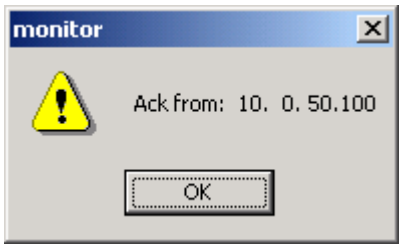


Fig. 41. Configuration dialog box

3. After clicking on the "***Configure Now***" button, the target device returns an "***ACK***" message, indicating the modification is successful as shown as follows:



The following table lists the functional description for each field.

Field Name	Field Descriptions
Broadcast IP	Except for the default IP 255.255.255.255, other items (IPs) are read from the file "seg.cfg". This field specifies a detecting IP range. It may be a designated IP or a broadcast IP.
Wishes	Specifies minimum number of the devices one wish to get reply from after sending an **Invite** request. If there is not as many as devices responding to ones invitation, the system repeatedly sends invitation until ones request is fulfilled.
Reply	Indicates the actual number of devices this utility program detected.
Retry	Specify the number of times that an Invite request is re-sent.
Locate	Locate the specified device.
Reset	Reset the selected device.
Config	Configure the selected device.
Exit	Exit this utility.
IP Address	Indicate the IP address of the device that replied to ones request. • Leading tag "!" stands for IP address collision, possibly caused by duplicated IP addresses on the network. • Leading tag "?" stands for Mac address collision, possibly caused by duplicated Mac addresses on the network.
MAC Address	Indicates the MAC address of responding device.
Gateway	Indicates the IP address of the gateway.
Subnet Mask	Indicates the TCP/IP network mask.
OS	Indicates the OS version of the responding device.
AP Version	Indicates the AP version of the responding device.
Model	Indicates the model number of the responding device. This field is only available for monitor.exe version 2.0 and above.

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